TECHNO-MARVELS AT THE CONSUMER ELECTRONICS SHOW

http://popularmechanics.com APRIL 1998

Popular Mechanics

WORLD'S BIGGEST TRUCK

GREATEST SECRETS OF THE COLD WAR

DECLASSIFIED

7 Minutes To Nuclear Doomsday, And Other Terrifying Revelations In Recently Declassified Government Documents

-PAGE SPECIAL SECTION

DOWN-TO-EARTH HOME GARDENING GUIDE

08638 04 0 754744 1 $2

LIFETIME ACHIEVEMENT AWARD.

FORD CROWN VICTORIA

Reward yourself with the newly redesigned Crown Victoria. A car that's rich in tradition just got richer with a classic restyling that'll be turning more heads than a tennis tournament. Plus get all the power, grace and comfort that are signature Crown Victoria.

ONLY CAR IN ITS CLASS WITH A FIVE-STAR GOVERNMENT CRASH TEST RATING.*

★★★★★

We are pleased to inform you that Crown Victoria has been awarded the exclusive five-star government crash test rating for both driver and front passenger.* The highest award it can achieve and the only car in its class to do so. Not to mention, Crown Victoria offers standard Second Generation driver and front passenger airbags** and available anti-lock brakes with electronic traction control.

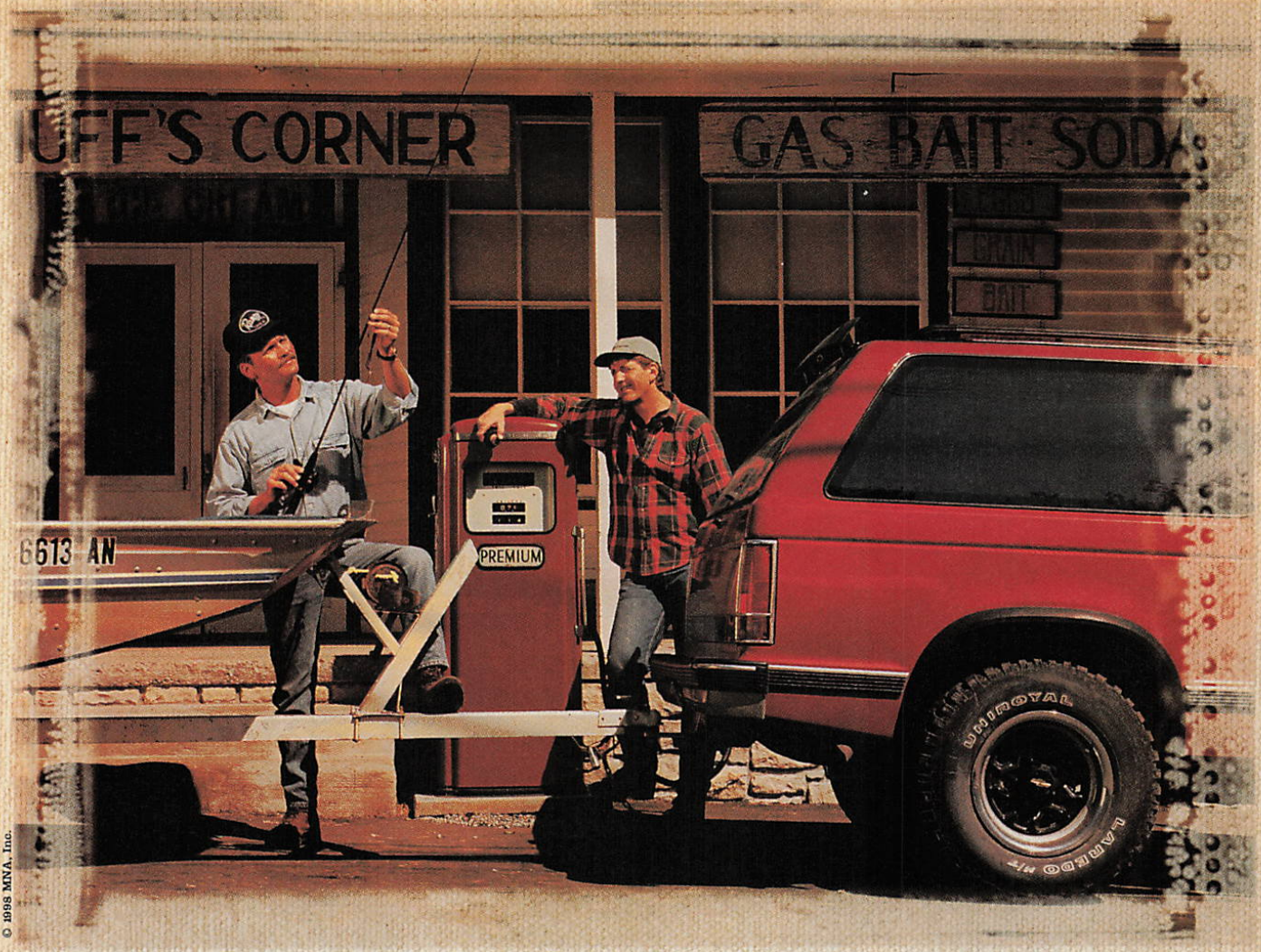
HAVE YOU DRIVEN A FORD LATELY?

Ford

1-800-258-FORD or www.ford.com

Ford Credit

*Government data only useful in comparing vehicles within 500 lbs.
**Always wear your safety belt and secure children in the rear seat.



© 1998 MNA, Inc.

Some Folks You Know Pretty Well. Others You've Known Long Enough To Fish With.

UNIROYAL®

Tried. And True.™

There's a good reason Laredo® Light Truck Tires are made tough with DuraShield® construction. They're put to the test every day to be as reliable, as dependable and as true as the folks who choose them.

For the Uniroyal® dealer nearest you, call 1-800-521-9796.

LAREDO®

PRINTED IN U.S.A.

Popular Mechanics®

APRIL 1998
VOLUME 175
NO. 4

AUTOMOBILES

32 Detroit Spy Chevy's '99 Impala, Corvette rumors, '99 Ford Explorer and Expedition, and a Caddy SUV.

40 Asia Spy First look at the '99 Toyota Solara, Kia minivan, Mazda Cab Plus 4, Hyundai Tiburon and Nissan's new SUV.

52 New Cars BMW's M3 convertible and M Roadster, the Lexus RX 300 and LX 470, and Nissan's 200SX SE-R and Sentra SE.

62 Small World Microcars are a big hit around the world. But you can't get them here.

84 Drive Report: Euclid R260 We take the ultimate pickup for a spin.

137 Car Care
- **Car Clinic:** Car Care Q&A.
- **Saturday Mechanic:** Rearview mirror fix.

SCIENCE/TECHNOLOGY

15 Tech Update
- New "diet pill" eradicates mosquitoes.
- Pen reads and translates foreign words.
- Tiny transmission boosts micro-engine power.

42 The Chemistry Of Violence The link between pollution and crime.

48 Think It's New? Think Again! The dirty truth about vacuum cleaners.

68 COVER STORY: Greatest Cold War Secrets Shocking events the U.S. government didn't want you to know about.

HOME IMPROVEMENT

89 Special Section: Gardening Guide
- **Growing Flowers** Planting basics.
- **Gardener's Bookshelf** Better by the book.
- **Planting Mature Trees** Enjoy full foliage now.
- **Container Gardening** Pots are quick and easy.
- **Proper Soil Prep** Manna for your plants.
- **Gardening By Mail** Catalogs full of goodies.

ELECTRONICS

44 PMZone Make a bid on our PM project car.

50 Cable Of The Future Cable television moves up to digital technology.

58 Best Of The Consumer Electronics Show High-def plasma TV and other techno-marvels.

80 Nikon F5 The next must-have 35mm SLR.

NEW PRODUCTS

122 Great Stuff Here's the newest gear you'll want to own.

OUTDOORS

38 Walk 'N' Roll Detachable wheels roll into the inline skate marketplace.

55 High-Tech Binoculars The new ones put you up close and personal.

76 Cowboy Shooting The newest shooting sport sends you back to the Wild West.

DEPARTMENTS

4 Editor's Notes
10 Letters
12 Time Machine
144 Communicate With Us
158 Coming Up Soon

WESTLIGHT/O'BRIEN PRODUCTION PHOTO

EDITOR'S NOTES

● **How many times** in recent years have you left a movie that had to do with the CIA, spies and government intrigue and thought: No way, that could never really happen. Oh yeah? In recently declassified government documents, Science/Technology Editor Jim Wilson found enough astounding true-life Cold War episodes to make a dozen movies—and one magazine article that begins on page 68. Perhaps most chilling was finding out that the United States was actually a scant 7 minutes away from all-out nuclear war with the Soviet Union in 1979. In the course of writing the article, Wilson called retired Gen. Bill Odom, who was the military assistant to National Security Advisor Zbigniew Brzezinski at the time. When Wilson finally got through to Odom's secretary, he asked for a comment from Odom on the event. After some minutes, the secretary came back to the phone: "The general doesn't want to talk about that. He said he doesn't even want to think about it." Neither do we.... **Special thanks** to Lehigh Coal & Navigation Co., of Tamaqua, Pennsylvania, for allowing us to use its brand-new Euclid R260 for our April Fools' road test this issue. Thanks also to Highway Equipment & Supply Co., of Drums, Pennsylvania, for putting the R260 together in time for us to make our deadline.... **Hey, Lynn in Detroit,** go back to blonde!... **This was a month of awards,** giving and getting. First, as a longtime supporter and founding member of the Tread Lightly organization, we sponsor the annual Tread Lightly Advertising Leadership Award, which annually goes to the vehicle manufacturer that best incorporates the principles of Tread Lightly in its advertising messages. Those principles include low-impact, responsible usage of outdoor recreation areas and preservation of the environment. This year, the winner was Toyota, also a longtime supporter of Tread Lightly, and its advertising agency, Saatchi and Saatchi Pacific. POPULAR MECHANICS Publisher Jay McGill and Tread Lightly executive director Lori McNeely presented the award to Toyota's senior vice president and general manager, Dave Illingworth, and Saatchi's executive vice president, Richard Weigand. Congratulations to Toyota. And congratulations to our own West Coast Editor Scott Oldham and Automotive Editor Don Chaikin. They recently won a 1998 International Wheel Award from the Detroit Press Foundation for their article "Montana Run," which appeared in the October 1996 issue of POPULAR MECHANICS. Way to go, guys! Till next time.

PM PHOTO BY A. GREG ALTER

Left to right: Jay McGill, Richard Weigand of Saatchi, and Lori McNeely and Dave Illingworth of Tread Lightly.

PM PHOTO BY CLIFF GROMER

Don Chaikin and Scott Oldham

Joe Oldham

Popular Mechanics

Editor-In-Chief Joe Oldham

Creative Director Bryan Canniff
Managing Editor Sarah Deem

Home Improvement
Editor Steven Willson
Associate Editors Thomas Klenck, Roy Berendsohn
Contributing Editors Norman Becker, Rosario Capotosto, Steve Toth

Automotive
Editor Don Chaikin
Detroit Editor Jim Dunne
Associate Editor Mike Allen
West Coast Editor Scott Oldham
Contributing Editors Cliff Gromer, Michael Lamm, Jim McCraw

Science/Technology
Editor Jim Wilson
Contributing Editor Fred Mackerodt

Outdoors
Editor Jim Gorant
Contributing Editor Rich Taylor

Electronics
Editor Tobey Grumet
Contributing Editor Rebecca Day

Art Department
Art Director Alan Andresen
Associate Art Directors Tom Kane, Harriette Lawler
Photo Editor Nancy Coggins

The PMZone
Editor Bill Rhodes

Production
Electronic Prod. Manager Louisya McFarland
Editorial Prod. Editor Rhonda H. Caguiat
Copy Editor Kyle McGinnis
Electronic Prod. Assoc. Mike Vukobratovich
Assoc. Production Editor Brad Dunn

Editorial Administration
Administrative Asst. Josephine Caronia
Executive Assistant Barbara A. Novak

Reader Information Services
Manager Patricia A. Woods

Editorial Offices
224 W. 57th St., New York, NY 10019
(212) 649-2000

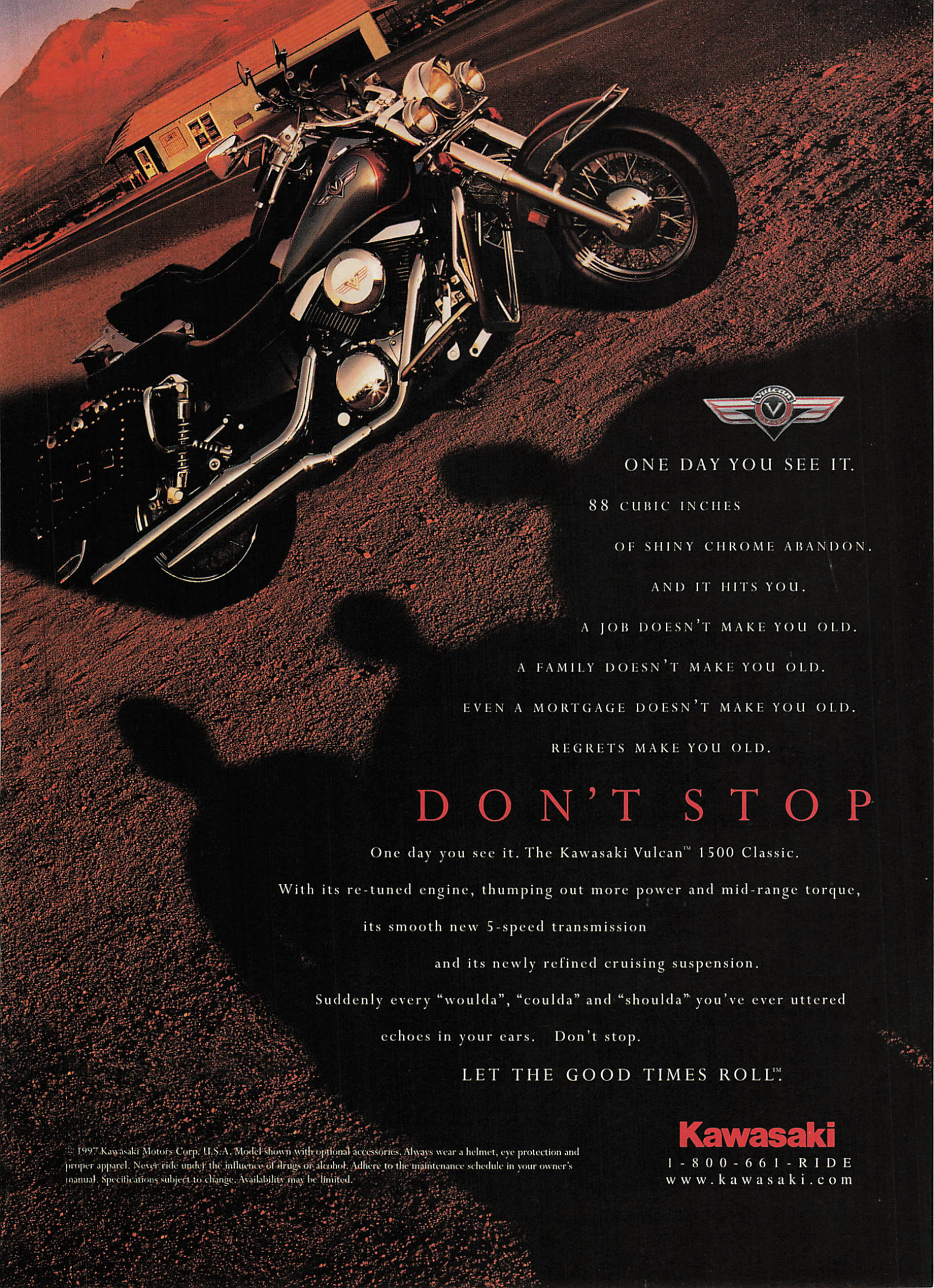
We cannot be responsible for loss of unsolicited queries, manuscripts or photos. For return, they must be accompanied by adequate postage.

SUBSCRIPTION SERVICE: Popular Mechanics will, upon receipt from its reader of a completely new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery either to the Postal Service or alternate carriers within six to twelve weeks. If for some reason this cannot be done, you will be notified promptly of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 7170, Red Oak, IA 51591. •Should you have any problem with your subscription, please write Joan Harris, Customer Service Department, Popular Mechanics, P.O. Box 7170, Red Oak, IA 51591 or call toll-free 1-800-333-4948. Please enclose your mailing label when writing to us or renewing your subscription. •Subscription prices: United States and possessions, $19.97 for one year; $34.97 for two years. Canada and all other countries add $16.00 for each year.

Use this address for subscription orders and inquiries. **POPULAR MECHANICS,** P.O. Box 7170, Red Oak, IA 51591.

MAILING LISTS: From time to time we make our subscriber list available to companies who sell goods and services by mail that we believe would interest our readers. If you would rather not receive such mailings, please send your current mailing label or exact copy to: **POPULAR MECHANICS,** Mail Preference Service, P.O. Box 7024, Red Oak, IA 51591-0024.

AS A SERVICE TO READERS, Popular Mechanics publishes newsworthy products, techniques and scientific and technological developments. Due to possible variance in the quality and condition of materials and workmanship, Popular Mechanics cannot assume responsibility for proper application of techniques or proper and safe functioning of manufactured products or reader-built projects resulting from information published in this magazine.



ONE DAY YOU SEE IT.

88 CUBIC INCHES

OF SHINY CHROME ABANDON.

AND IT HITS YOU.

A JOB DOESN'T MAKE YOU OLD.

A FAMILY DOESN'T MAKE YOU OLD.

EVEN A MORTGAGE DOESN'T MAKE YOU OLD.

REGRETS MAKE YOU OLD.

DON'T STOP

One day you see it. The Kawasaki Vulcan™ 1500 Classic.

With its re-tuned engine, thumping out more power and mid-range torque,

its smooth new 5-speed transmission

and its newly refined cruising suspension.

Suddenly every "woulda", "coulda" and "shoulda" you've ever uttered

echoes in your ears. Don't stop.

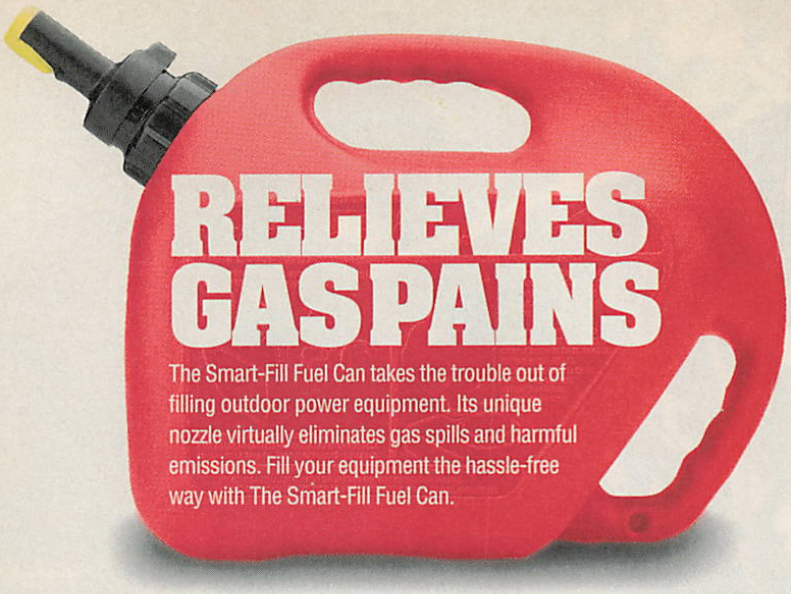
LET THE GOOD TIMES ROLL™.

© 1997 Kawasaki Motors Corp. U.S.A. Model shown with optional accessories. Always wear a helmet, eye protection and proper apparel. Never ride under the influence of drugs or alcohol. Adhere to the maintenance schedule in your owner's manual. Specifications subject to change. Availability may be limited.

Kawasaki

1-800-661-RIDE

www.kawasaki.com


RELIEVES
GAS PAINS
The Smart-Fill Fuel Can takes the trouble out of filling outdoor power equipment. Its unique nozzle virtually eliminates gas spills and harmful emissions. Fill your equipment the hassle-free way with The Smart-Fill Fuel Can.

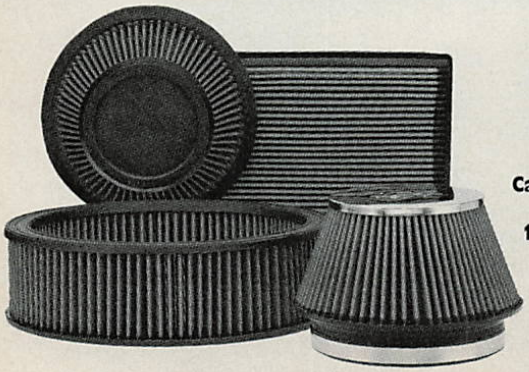
BRIGGS & STRATTON
SMART-FILL FUEL CAN

EASY FILL WITHOUT THE SPILL

FOR THE NAME OF A RETAILER NEAR YOU OR TO ORDER, CALL 1-800-236-2426.

MILLION MILE AIR FILTER!

Every time you change your car's paper air filter it gets thrown into a landfill along with over 140 million others each year... and they keep piling up because you can only use them once. So change to K&N, the reusable air filter. The best and last filter you'll ever buy, because with K&N's premium cotton gauze air filter you simply wash and re-install it time after time. And K&N air filters are guaranteed for 10 Years or One Million Miles, call today for a free brochure or the K&N retailer nearest you. K&N the best air filter for your engine and the environment.



K&N®

Call today for a FREE brochure or the K&N retailer nearest you: 1-800-992-3000, access code 38-04

K&N Engineering • P.O. Box 1329
Riverside, CA 92502
or call: (909) 684-9762
e-mail: KNFilters@AOL.com
www.KNFilters.com

You can feel the power in the air!

Popular Mechanics

Publisher Jay McGill

Group Marketing Director William E. Congdon, 212/649-3088

Group General Manager Bruce A. Mitnick, 212/649-3079

ADVERTISING

Director Gregg R. Hano, 212/649-3135

New York
224 W. 57th St., New York, NY 10019
Eastern Advertising Manager Tony A. Eason, 212/649-3141
David M. DeVito, 212/649-3142
Hallie I. Grebler, 212/649-3039

Chicago
1 S. Wacker Dr., Chicago, IL 60606
312/984-5190
Manager Richard T. Weithas
Spencer J. Huffman

Detroit
Hearst Magazines Sales, Inc.
2301 W. Big Beaver Rd., Troy, MI 48084
248/649-2981
Manager Laurence E. Lantzy

Los Angeles
3000 Ocean Park Blvd., Suite 2002
Santa Monica, CA 90405
310/450-8881
Manager John Driscoll

San Francisco
5 Third St., Suite 910, San Francisco, CA 94103
415/778-6486
Manager Thomas H. Petersen

Atlanta
1003 Potomac Rd., Atlanta, GA 30338
770/352-7652
Manager Erin M. Frank

Florida
Saba & Associates
4826 Cheval Blvd., Lutz, FL 33549
813/948-2088
Manager Ron Saba

Dallas
D.F. Kellner & Co.
2714 Brookside Ln., McKinney, TX 75070
972/529-9687
Manager Daniel F. Kellner

Mail Order
Manager Barbara Jones, 212/649-3136
Carolyn Bernstein, 212/649-3218

Classified
Manager Kevin Bristow, 708/352-8304

MARKETING

Marketing Services Manager Kim A. Boknoski, 212/649-3085
Promotion Manager Elizabeth Galiardo, 212/649-3138

PRODUCTION

Director Carole L. Hartman
Manager Lisa M. Caputo, 212/649-3164

Published by The Hearst Corporation
FRANK A. BENNACK JR.
President & Chief Executive Officer
GEORGE R. HEARST JR.
Chairman
GILBERT C. MAURER
Executive Vice President & Chief Operating Officer

Hearst Magazines Division
CATHLEEN BLACK
President
K. ROBERT BRINK
MARK F. MILLER
Executive Vice Presidents
JAY McGILL
Vice President, Group Publishing Director
RICHARD E. DEEMS
Publishing Consultant

POPULAR MECHANICS is published monthly by Hearst Communications, Inc., a unit of The Hearst Corporation, 959 Eighth Ave., New York, NY 10019, U.S.A. Frank A. Bennack Jr., President; George R. Hearst Jr., Chairman; Gilbert C. Maurer, Executive Vice President; Victor F. Ganzi, Executive Vice President; Jodie W. King, Vice President and Secretary; Edwin A. Lewis, Vice President and Treasurer. Hearst Magazines Division: Cathleen Black, President; K. Robert Brink, Executive Vice President; Mark F. Miller, Executive Vice President; George J. Green, Executive Vice President; Raymond J. Petersen, Executive Vice President; John A. Rohan Jr., Vice President & Resident Controller; Jay McGill, Vice President, Group Publishing Director.

Escort Performance. Cordless Convenience.

Now top-rated radar and laser detection from Escort gets even better

The remarkable cordless SOLO® radar and laser detector is a revolutionary new design — packing more performance, more convenience, and more features into a high-tech package even smaller than before.

There's no other detector like it.

And now you can test drive the new cordless SOLO risk-free for a full month.

More Performance

"Discrimination among the three radar bands and laser is excellent, in both visual and audible warnings."
– Car and Driver

Unlike ordinary detectors, SOLO provides a remarkable combination of both long range warning, and minimized false alarms.

Also Available

If you prefer a corded detector our full-featured Passport 4600 is an incredible value at only $179.95

"A nice piece indeed."
– Automobile Magazine

The secret is advanced Digital Signal Processing (DSP), just one of the dozens of patented technologies we've developed at ESCORT.

More Features

"Its cordless capability and programmable customizing are endearing."
– Car and Driver

New SOLO provides 360° detection of all radar bands: X, K, Photo Radar, and SuperWide Ka. Front and rear laser detection is also built in. But there's more to SOLO than just great performance.

The industry's first *programmable* detector, new SOLO lets you customize its operation. You control SOLO's AutoMute, display brightness, audio tones and volume, even City mode sensitivity. Your settings are saved in memory – even when changing batteries.

SOLO also includes SafetyPilot™ technology to detect Safety Alert™ transmitters that warn you of approaching driving hazards in some communities.

No other detector provides as many benefits for the driver.

Smaller Size

"This detector is exceptionally easy to use."
– Car and Driver

Even with all this new technology, the new Solo is 50% more power efficient than our previous Solo 5 model. New SOLO is powered by only two AA batteries (an optional power cord is also available). It's the smallest, most efficient cordless detector in the world. But don't take our word for it.

Our previous SOLO model was 50% larger than the New SOLO

Our money-back guarantee lets you test drive SOLO in your own car for 30 days at no risk. Call today.

Call Toll-Free
1-800-433-3487

ESCORT Solo $199.95
Optional Power Cord $29.95
30 day Money Back Guarantee

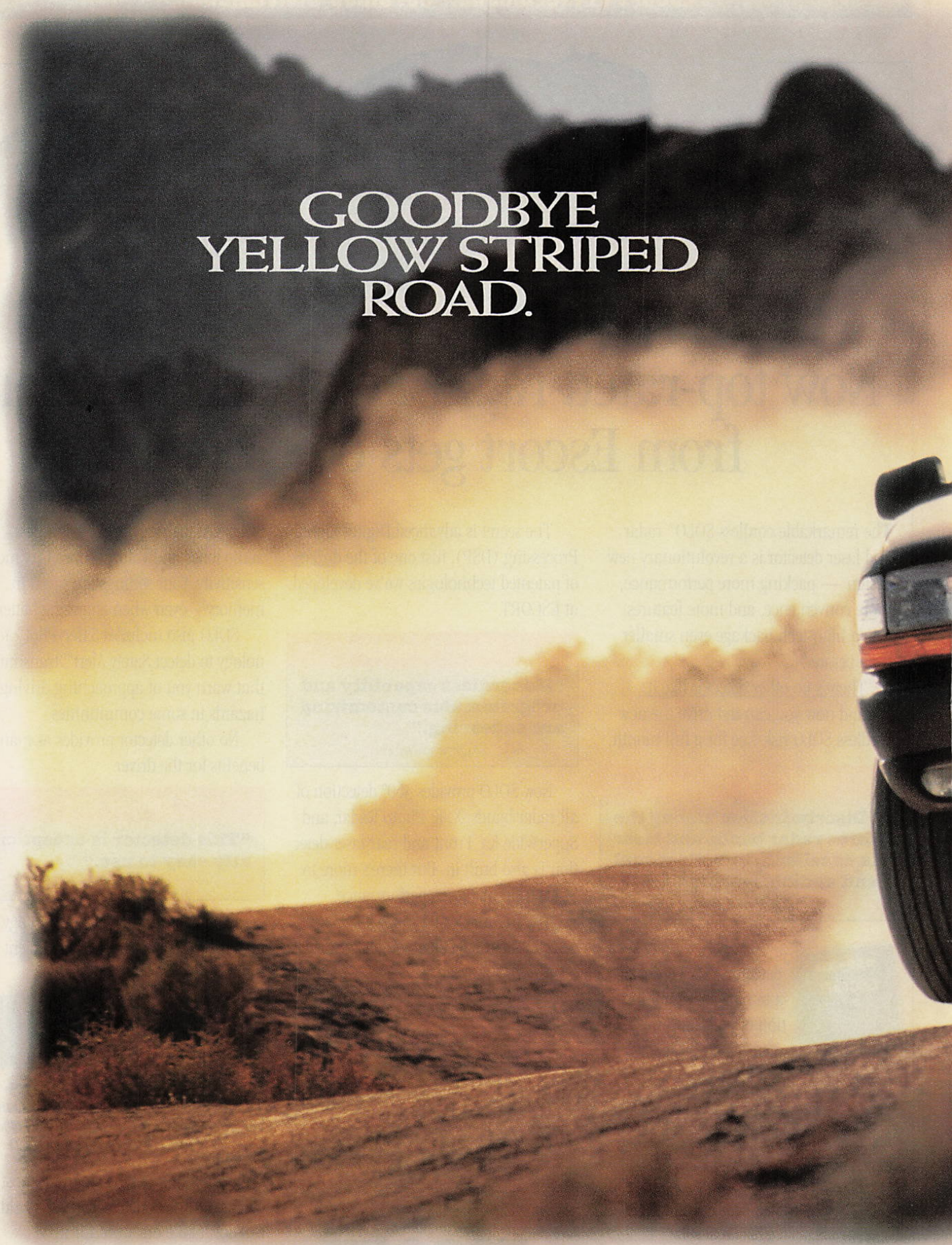
MasterCard VISA AMERICAN EXPRESS DISCOVER

Plus shipping and handling
Ohio residents add 5.5% sales tax

ESCORT

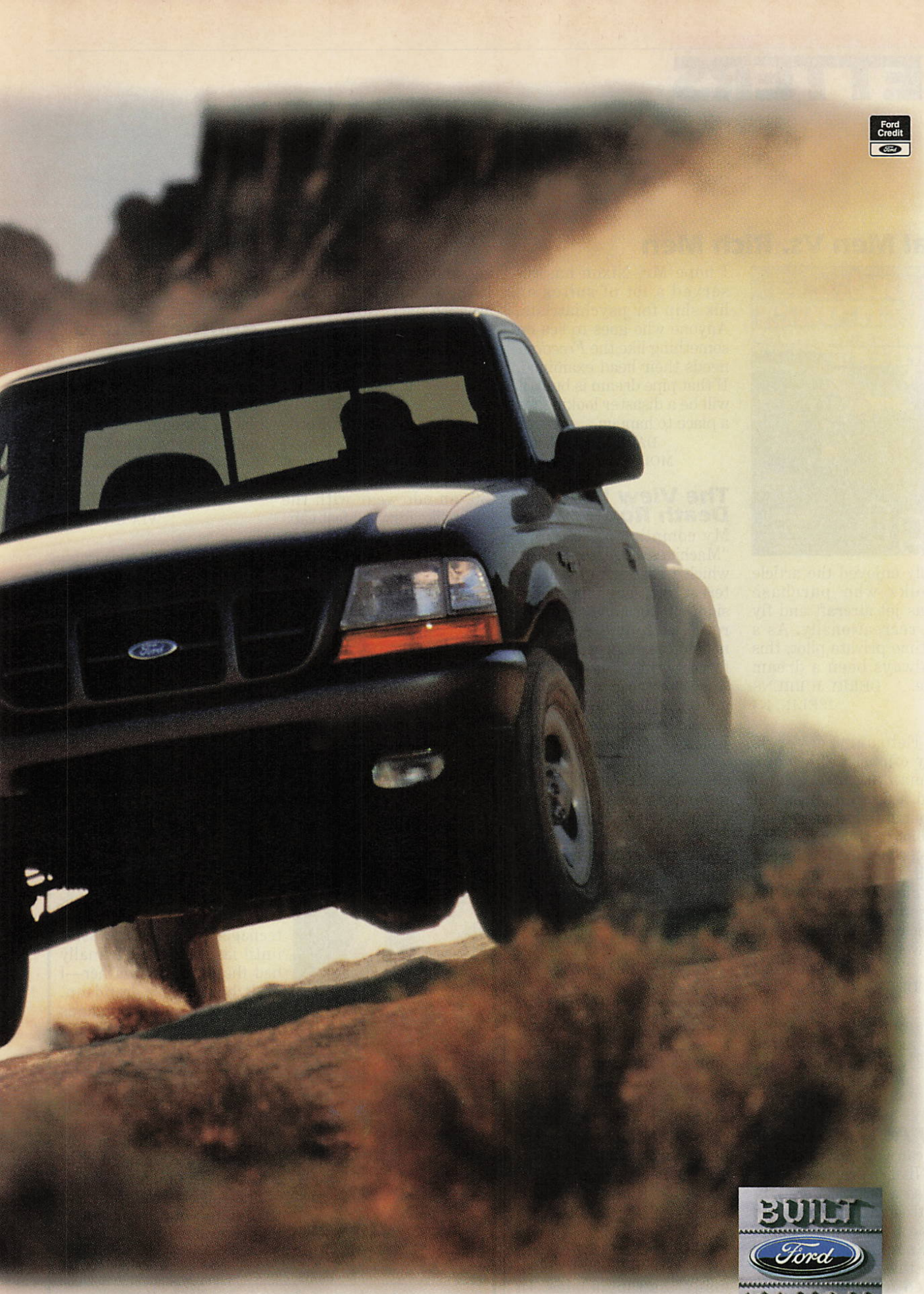
5440 West Chester Road • West Chester OH 45069
► Department 206848

©1998 Escort, Inc.



• Redesigned for '98 • Standard new 2.5L engine with increased power* • Available shift-on-the-fly 4-wheel drive

*4x2 model only. **'98 Ranger XL MSRP; XLT 4x4 shown $19,695 MSRP incl. PEP 867A and Off-Road Pkg. Tax, title extra. Closed course, professional driver.



• New SLA suspension • Starting at $11,395** THE NEW RANGER

1-800-258-FORD or www.ford.com

LETTERS

Real Men Vs. Rich Men

Popular Mechanics
REAL MEN FLY FIGHTER JETS
WEB vs. NET
It's Web Warfare As Set-Top Boxes Battle To Put You Online
THE GREAT AMERICAN TRUCK
Celebrating A 50-Year Love Affair With Ford Pickups

I really enjoyed the article on folks who purchase surplus jet aircraft and fly them recreationally. As a long-time private pilot, this has always been a dream for me.

GERRY JURRENS
ISELIN, NJ

The February cover is highly offensive. I'm not a real man because I can't afford a fighter jet or get my jollies flying one? Real men like to tinker with the projects you explore every month. Real men ride motorcycles and horses, fix things around the house and include their families in their weekends.

RICK WORSHAM
DENHAM SPRINGS, LA

You should have named your article "Real Rich Men Fly Fighter Jets."

ROBERT C. RANDALL
LANSING, MI

City At Sea

How can you describe Norman Nixon's proposed *Freedom* as a practical ship? A monstrosity that size would not be a viable ship. To build such a thing would prove that no lessons were learned from the *Titanic*. Tell Nixon to see the movie.

ED McMORROW
BEVERLY, MA

Letters are subject to editing for length, style and format.

I hope Mr. Nixon has reserved a lot of suites on his ship for psychiatrists. Anyone who goes to sea on something like the *Freedom* needs their head examined. If that pipe dream is built, it will be a disaster looking for a place to happen.

DAVE ALEXANDER
MOUNTAIN VIEW, CA

The View From Death Row

My compliments on your "Machines of Death" article, which I read with great interest and some apprehension, sitting here on death row. Death by execution is not a pleasant prospect even for the guilty, but it's far worse for those who are not guilty and have been wrongly convicted. Sadly enough, I share the dilemma of the wrongly convicted. I was charged with murder after defending myself against intruders at my home.

Being on death row is like being tied to the railroad tracks. You know the train is on its way, and your only hope is to cry out to someone to come loosen the rope.

JOHNNY BERNAY
McALESTER, OK

Makeover Beauty

I encouraged my husband to get rid of our hunk of junk '85 Cutlass and its ugly '78 stepsister—at any cost! I convinced him they were too conservative to ever be classics. Now if he spies that beauty from your car project, I'm in deep trouble.

LORI LEBLANC
ST. LOUIS, MO

Ford F-Series

Your article brought back many fond memories. In 1948, my brother and I bought a Ford F-3 Heavy Duty cab and chassis for our body repair shop. We used it for 30 years for towing, and when we retired in 1978, we sold the truck to an auto parts store. They still use it as a standby at local demolition derbys.

MILTON HENKE
BLUE EARTH, MN

Anyone who loves old Fords knows that the 1953-55 F-100 had a beautiful swept windshield. You depicted a '56, an odd year with the Chevylike forward fast cab.

ED CRELIN
VIA INTERNET

Didn't the ohv V8 engine you mentioned first appear in 1954, after Ford's 50th?

ED ACKERMAN
VIA INTERNET

The 272 cu. in. ohv Y-block V8 first appeared in 1954. The truck we showed was, indeed, a '56. We regret the errors. —*Ed.*

Another Round Of O.J.

A lot of people seem to have a problem with the pictures of O.J. Simpson, which I thought were hilarious. I believe they're being a little oversensitive. Keep up the good work.

K. WINEGARDEN
VIA INTERNET

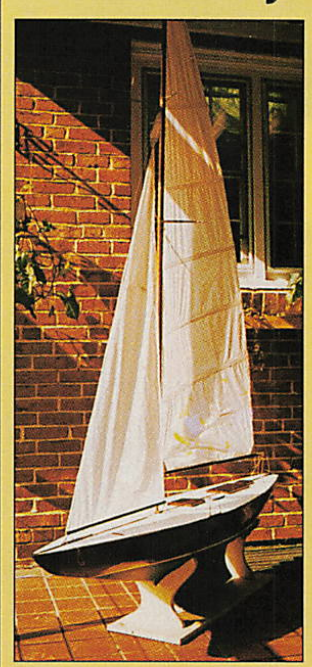
Thanks for not succumbing to pressure. Some readers have missed the point, that digitally altered graphics can affect our justice system. The crude responses you've gotten are really the rantings of a lynch mob.

BILL WHITE
LOS ANGELES, CA

Advertisement

STANLEY

Reader Project Of The Month



On April 23, 1942, I purchased plans from POPULAR MECHANICS for *Vanja*—a class-A racing yacht model. I was a teenager then, but it wasn't until last year that I finally had the time to build her—I built her for my grandson. She is made out of Honduras mahogany and her sails and rudder are radio-controlled. Her overall length is 73.25 in. Her beam is 15 in. and her draft is 11 in. Her sail area is 1850 sq. in.

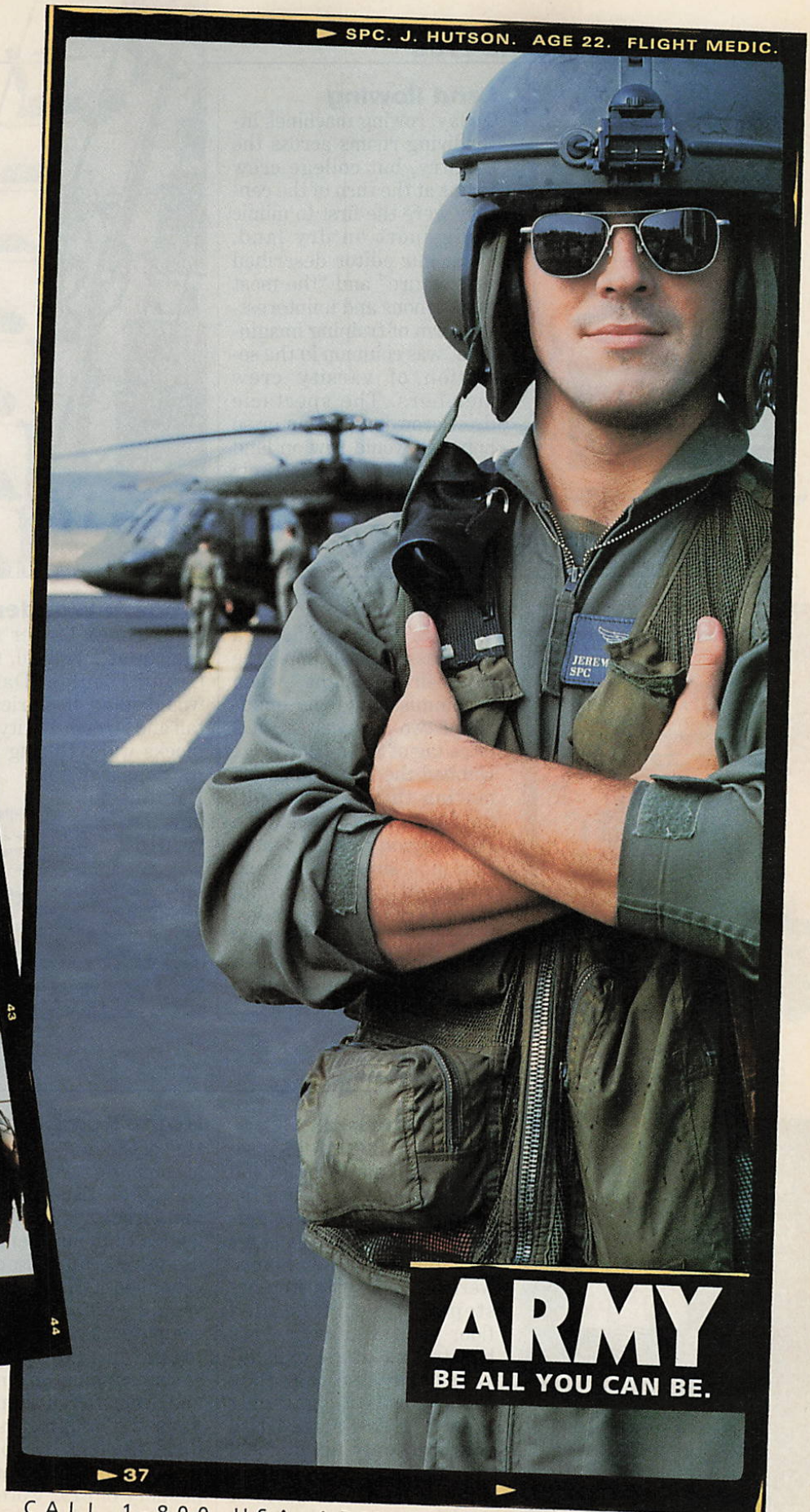
It took me about 3 months to complete. I enjoyed constructing the hull most of all.

She is a big beautiful yacht thanks to your plans, plans that never die.

ANTHONY C. CHARWICK
WILMINGTON, DE

If your project is chosen as Reader Project Of The Month, you will receive a Stanley Home Improvement Kit, complete with hand and decorating tools, and an electric stapler/nailer, valued at more than $200. For your project to be considered, please send a clear, color photo and brief description to: Reader Project Of The Month, Popular Mechanics, 224 W. 57th St., New York, NY 10019.

YOU'LL SUCCEED AS A TEAM AND THRIVE AS AN INDIVIDUAL.
YOU WILL BE A SOLDIER.



CALL 1-800-USA-ARMY www.goarmy.com

TIME MACHINE

90 YEARS AGO: APRIL 1908

APRIL
10 CENTS
POPULAR MECHANICS
WRITTEN SO YOU CAN UNDERSTAND IT
Motor Boats Cruise Rivers, Lakes and Ocean
U. S. Government to Have Airship Fleet
Plan to Climb the Alps in Boats
The Evolution of Rubber
Danger in Topping Tall Trees
182 Articles, and 156 Illustrations IN THIS NUMBER

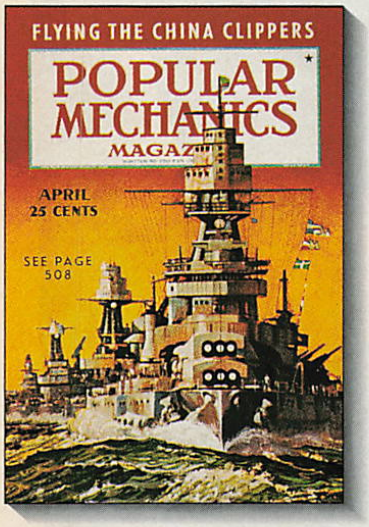
Land Rowing

Today, rowing machines litter living rooms across the country, but college crew teams at the turn of the century were the first to mimic their sport on dry land. What our editor described as "torture" and "the most monotonous and uninteresting form of training imaginable" was common in the selection of varsity crew members. The spectacle drew crowds: A dozen or so hopefuls would row on land for up to 2 hours as their coach barked the rhythm.

Banana Hauler

Imported bananas were often reduced to pudding by the long chain of hands that unloaded them from boats. But in New Orleans a new mechanical unloader gave the fruit a gentle ride. The machine unloaded 2500 bunches per hour with a soft canvas belt that prevented bruising. The banana unloader, which was built on a platform supported by 10 trucks, could roll to any spot along the wharf. It moved 7 million bunches a year.

60 YEARS AGO: APRIL 1938

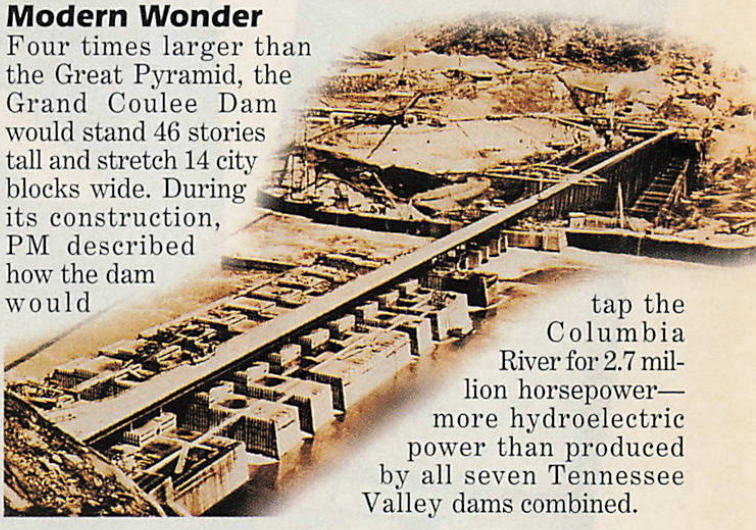


New Warships

The U.S. Navy introduced a new class of battleship—the super-dreadnought—when it commissioned the building of two new vessels, at a price tag of $70 million each. Dubbed the most expensive moving things ever built, the *North Carolina* and the *Washington* promised more than just superior fighting power at sea. They would serve as mobile naval bases. Weighing more than 40,000 tons each, the battleships were four times larger than their German counterparts.

Modern Wonder

Four times larger than the Great Pyramid, the Grand Coulee Dam would stand 46 stories tall and stretch 14 city blocks wide. During its construction, PM described how the dam would tap the Columbia River for 2.7 million horsepower—more hydroelectric power than produced by all seven Tennessee Valley dams combined.



30 YEARS AGO: APRIL 1968

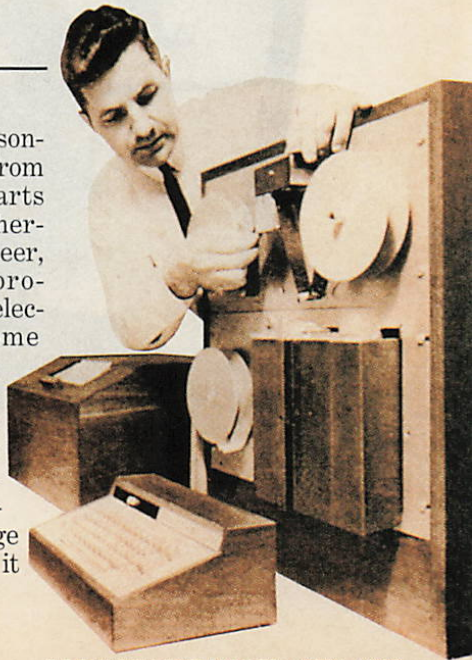
Are Cars Really Getting Better? Page 80
POPULAR MECHANICS
Build This 3-Stage
VACATION HOUSE
See Page 138 For Others You Could Be in by Summer
Exploring Florida's Treacherous Underground Rivers
A NEW PAINKILLER— Merciful as Morphine, Safe as Aspirin
Riding Up Front on Japan's 132-mph Train Page 84
HANDSOME HOME PROJECTS: Coffee-Table Aquarium, Built-In Bookcase
Saturday Mechanic: Tune-Up Tips • Ansel Dan Gurney
What Those New Grades Tell You About Plywood
An Amazing New Molding Rubber To Cast Plastics

Vacation House

POPULAR MECHANICS gave readers plans to build the perfect vacation house for the summer of '68. Complete construction plans for six simple summer homes were available with step-by-step photos and detailed floor plans. The bungalows boasted a 3-stage expandable design, so that they could grow as the guest list grew. The first-stage house required only about $900 worth of materials. But that didn't include the price of the lawn chairs and guitar.

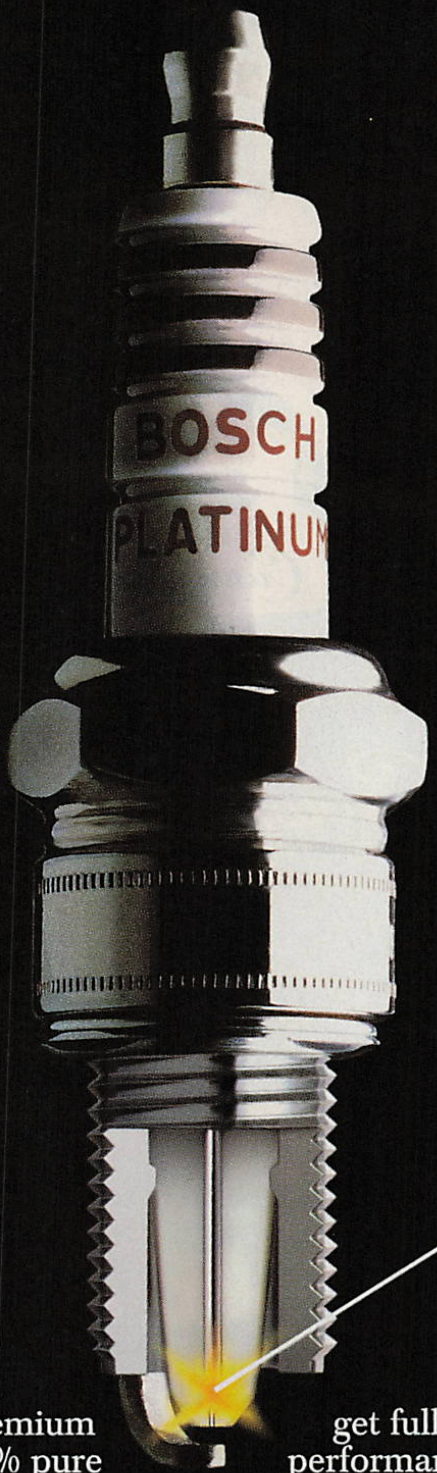
Home Computer

One of the first true personal computers was built from scraps of discarded parts and circuitry. Jim Sutherland, a Pittsburgh engineer, designed, built and programmed ECHO—the electronic computing home computer. The machine prepared taxes, kept clocks running on time and even offered simple games. Though it understood only 18 commands and had a storage memory of 8192 words, it foreshadowed the PC.



Enjoy our quality responsibly.
Crown Royal
Crown Royal
You have two more wishes.
CROWN ROYAL • IMPORTED IN THE BOTTLE • BLENDED CANADIAN WHISKY • 40% ALCOHOL BY VOLUME (80 PROOF) • ©1998 JOSEPH E. SEAGRAM & SONS, NEW YORK, NY

A 99.9% Platinum core makes Bosch 100% different from other spark plugs.



The only plug with a solid platinum center electrode heat-fused into an extended ceramic insulator. Other plugs put platinum alloy just on the tip.

Bosch Platinum is the only premium spark plug that heat fuses a 99.9% pure platinum center electrode for an air-tight seal. This superior design allows Bosch Platinum to reach its self-cleaning temperature faster. Which means you get full engine power over a longer performance life. So, for quicker starts, smoother acceleration and improved fuel efficiency, give your engine the only plug that's pure platinum. For a retailer near you, call **1-800-TOP-PLUG.**

©1998 Robert Bosch Corporation, Sales Group.

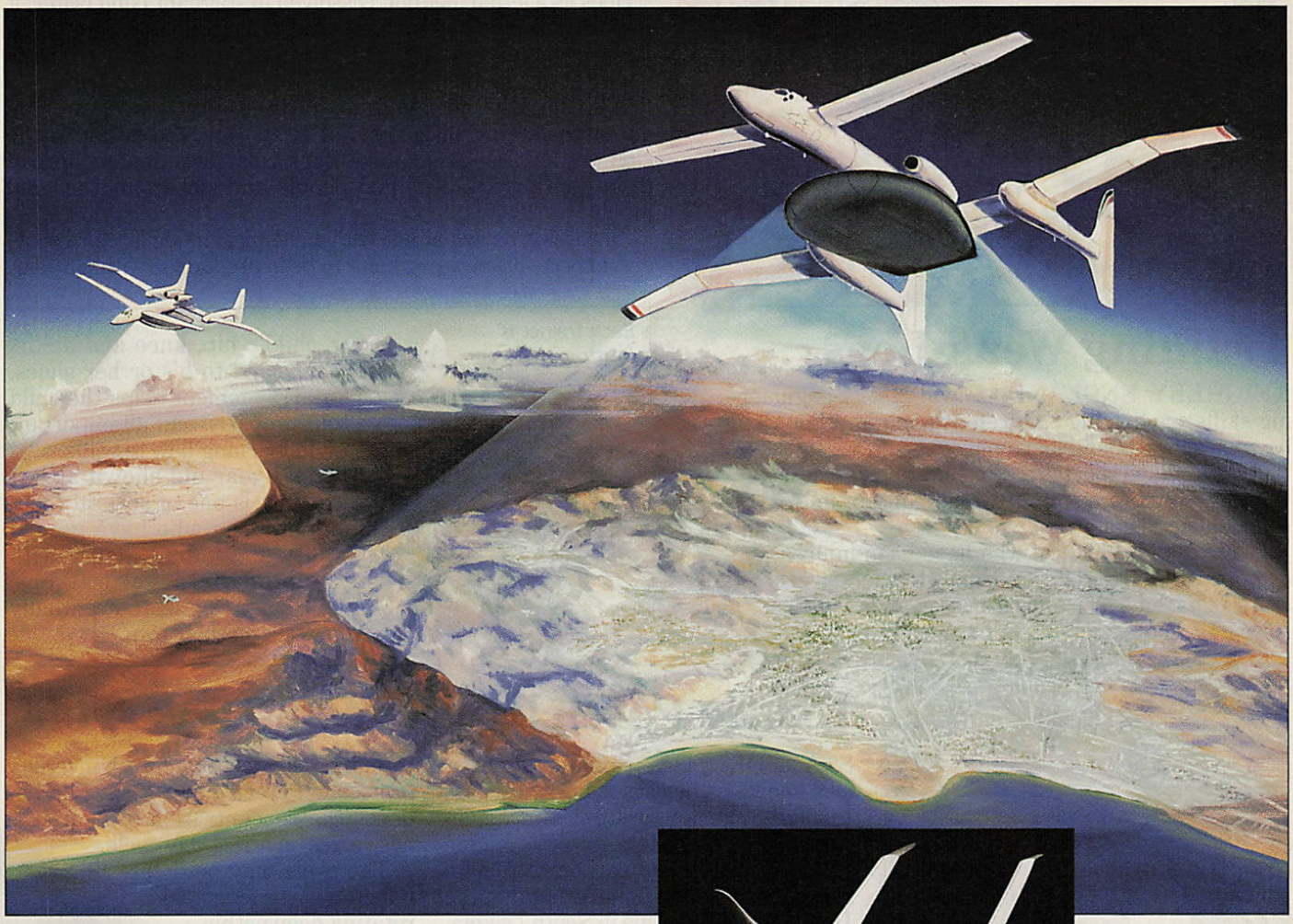
BOSCH

The Ultimate Spark Plug.

Popular Mechanics
APRIL 1998

TECH UPDATE

News Of Tomorrow's Technology Today



ANGEL TECHNOLOGIES CORP.: ILLUSTRATION AND PHOTO

Three HALOs will provide 24-hour service to each major city.

Airborne Modem Link

ST. LOUIS—A new type of high-altitude aircraft promises to dramatically reduce the cost of reaching out and touching someone with a high-speed modem.

Several projects that use balloons and ultra-efficient aircraft to carry high-speed telecommunications gear are now in development. POPULAR MECHANICS recently dropped in for a look at the project that is furthest along, the HALO—high-altitude long-operation—program created by Angel Technologies.

HALO will fly aboard Proteus, a 79-ft.-wingspan canard aircraft (above and inset) built by Scaled Composites, of Mojave, California. Powered by twin Williams/Rolls-Royce FJ-44-2 turbofan engines, the all-composite Proteus is designed to loiter at altitudes of 52,000 to 65,000 ft. for more than 15 hours at a stretch.

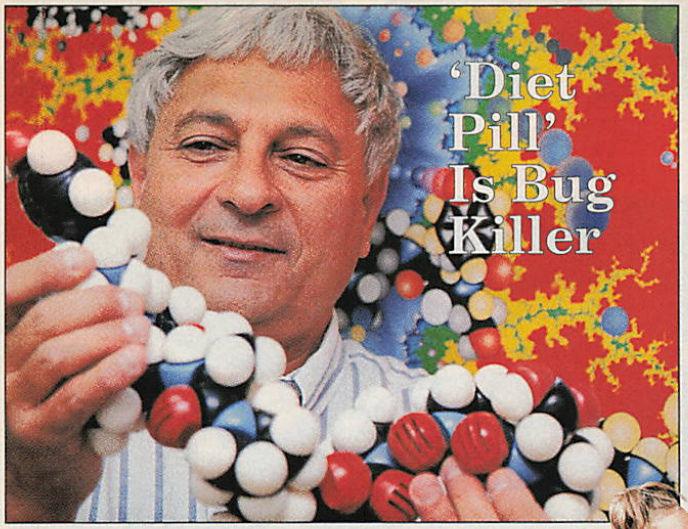
Each Proteus aircraft used for the HALO program will be equipped with a 20-ft.-dia. saucer-shaped pod. Its $110 million electronics package will work like those aboard telecommunications satellites.

Currently, the fastest commercial data links—available through satellite or cable connections—operate at 10 megabits per second (Mbps), and cost as much a $1000 per month. Angel says it plans to offer HALO users the same speed for about $250, and a 1.5Mbps connection for only $40 per month. The first test flight of the Proteus aircraft is scheduled for later this year. Angel expects to offer HALO service in major cities beginning in 2000.

Editor/Writer: Jim Wilson
Reporters: Stefano Coledan, Chris Dean, Brad Dunn, Mike Fillon, Barry Rosenberg, Jim Sugar

Highlights This Month

- **Slimming Bugs To Death**—"Diet pill" eradicates mosquitoes.
- **Pocket Translator**—Pen reads, translates foreign text.
- **Tiny Transmission**—Powertrain puts muscle on a chip.
- **Soft Landing**—Inflatable legs replace chutes, retrorockets.
- **Heart Saver**—Pump for patients awaiting transplants.
- **Cops Get Second Sight**—Glasses see invisible evidence.



UF/IFAS THOMAS WRIGHT PHOTO

'Diet Pill' Is Bug Killer

VERO BEACH, FL—If mosquitoes had a Most-Wanted list, Dov Borovsky's name would be at the top. The University of Florida researcher has developed an inexpensive and environmentally safe way to kill the blood-sucking pests.

While searching for a hormone to interrupt the insects' reproductive cycle, Borovsky instead discovered what he describes as a lethal diet pill. Dissolved in stagnant pond water, it is quickly gobbled up by mosquito larvae, who apparently find it rather tasty. Once ingested, it causes the insects to lose their ability to digest food. They starve to death within 72 hours.

A killer diet pill for mosquitoes may not seem like an earthshaking discovery, at first. But, according to the Centers for Disease Control, each year these insects spread diseases that kill 3 million people and sicken another 700 million worldwide.

Borovsky, shown at left with a chemical model of his discovery, expects his new bug killer to be in production within a year.

Training Weak Legs

KEIGHLEY, ENGLAND—David Hart's engineering skills are helping children who might otherwise be wheelchair-bound learn how to walk.

Hart's clinic specializes in building orthotic walking trainers, some of which contain more than 200 precision parts.

Designed for children who have been injured or born with birth defects, Hart's trainers are a cross between a pair of leg braces and a toy. Although the trainers vary, most are hinged at the child's hip, knee and ankle, and connected to his or her shoes. This arrangement helps the child stand properly—an all-important step in learning how to walk.

The 5-year-old shown at left with Hart is one of several thousand children who have gained mobility and independence with the help of the novel walkers. Many of Hart's patients eventually learn to walk on their own.

MIKE PATTISON PHOTO

CHRIS MIKAMI PHOTO

Peep-Box Maps

LONDON—Inventor Jeffrey Woolf has a low-tech answer to GPS and computer-aided navigation.

It is a device, no bigger than a deck of cards, called a Micromap, which works much like a library microfiche reader. Flipping it open with one hand separates a magnifying lens and a holder for credit card-size maps. Although the maps appear as a jumble of color to the unassisted eye, they contain all the information of their larger, hard-to-refold brethren.

Woolf, shown above demonstrating a Micromap, says the same back-to-basics technology could be used to compress technical manuals, timetables or any other paper-based documentation.

Exotic Particles Have 28-Day Cycle

STANFORD, CA—Subatomic particles known as neutrinos normally pass through ordinary matter. But sometimes they activate a detector made from 100,000 gal. of carbon tetrachloride located a mile underground in the Homestake Gold Mine in South Dakota.

After analyzing 24 years of data from the detector, Stanford University professor Peter Sturrock says he believes the concentration of neutrinos varies on a 28.4-day cycle.

The cycle may be determined by magnetic fields rotating deep within the sun.

Disney Goes Wild

LAKE BUENA VISTA, FL—Mickey Mouse will soon share his turf with lions and tigers and bears.

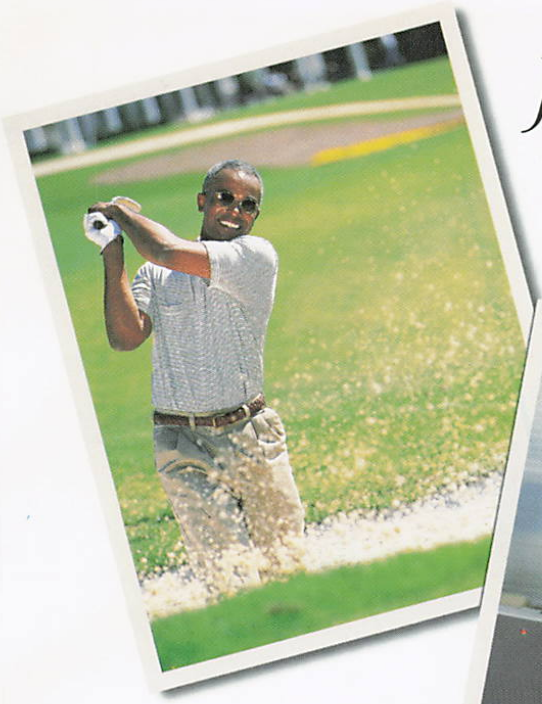
Animal Kingdom, Disney's newest attraction, will be 500 acres of make-believe African reserve where visitors can go on photo safaris in savannas, jungles and tropical forests. What they won't see are the cleverly camouflaged barriers designed to keep predators and potential prey—such as lions and antelopes—separated.

The same Disney magic will take visitors back 65 million years to see how the dinosaurs really lived. And, of course, there will be a full complement of Disney's characters.

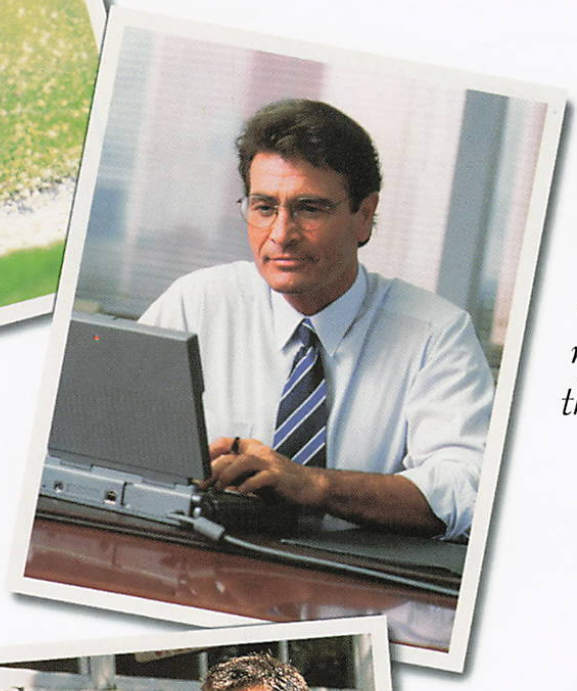
The park's residents moved in during the winter. It should open this month.

WALT DISNEY CO. PHOTO

 (More Tech Update on page 19)



Jeff Wood, father of three and weekend pro, made the change last year.



George Evans, successful stockbroker, made the analysis, then made the change.

Richard and Tina Runyan made the change, before they made the big move.

Mrs. Debbie Minnis, juggler of house, kids and career made the change, to make life easier.

Have you made the change?

Transitions® Lenses.
The comfortable lenses that change as the light changes.

See why so many people are making the change. If you're like most people, your life is busy enough without having to change your glasses every single time you walk outside. So let your prescription Transitions Lenses do the work for you. When you go outside they get dark. Inside they lighten. In fact, you might just say that your Transitions Lenses will see you through every minute of your busy day. They're lightweight plastic which makes them very comfortable. They also come with built-in scratch and UV protection. And you can choose from either a gray or brown tint. So ask your eyecare professional about Transitions Lenses, and make the change today.

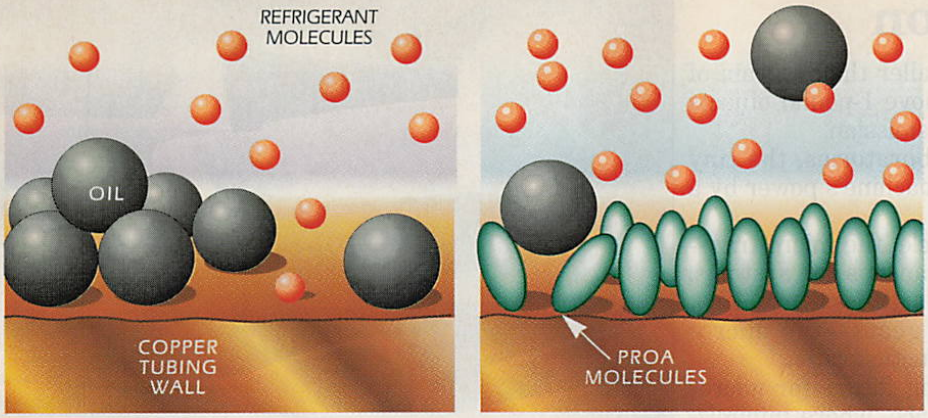
Indoors they lighten.

Outdoors they darken.

Transitions® LENSES

Transitions is a registered trademark of Transitions Optical, Inc., Pinellas Park, Florida.

www.transitions.com



PM ILLUSTRATION BY PAUL PERREAULT

Slippery Energy Savings

DENTON, TX—Errant oil costs owners of refrigeration systems lots of cold cash.

Freon and other heat-extraction fluids usually contain oil to lubricate moving parts. It often escapes from the compressor area and attaches itself to metal surfaces inside heat exchanger coils (above left). Overcoming the oil's insulating effect requires compressors to work harder, increasing energy costs.

Polar Shield says its PROA additive prevents the problem. Negatively charged regions on each molecule of additive attach to the metal, displacing oil and other contamination (above right). Since the molecules spread only one layer thick, the barrier is too thin to impede heat transfer.

The city of Austin says a test of PROA in its air conditioners resulted in a 22% cut in energy use, which will save the community $422 a year.

Pen Translates Foreign Words

TORRANCE, CA—A new type of electronic translator eliminates the most annoying part of looking up foreign words with other devices—typing seemingly jumbled letters on a Lilliputian keyboard.

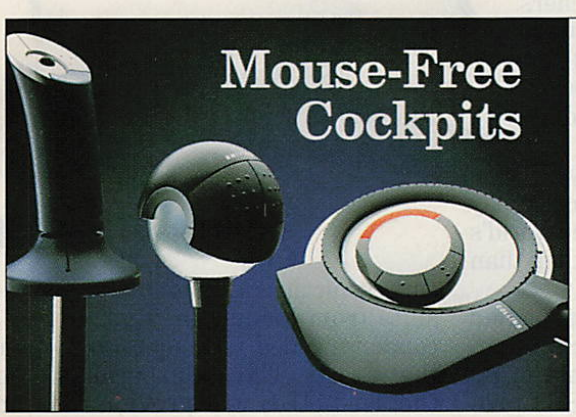
The Quicktionary translating pen reads for itself. Simply run the head of the scanner over a foreign word—as though marking it with a highlighter—and the device displays the common English equivalent on a narrow screen.

Seiko Instruments has announced a French/English model that will sell for $250. Quicktionaries that translate Spanish and other languages should be available later this year.

SEIKO INSTRUMENTS PHOTO

Quicktionary can translate 400,000 words and idioms.

Mouse-Free Cockpits



ROCKWELL COLLINS PHOTO

CCD (left) resembles a sidestick, (middle) uses a top-mounted control and (right) has a rotating inner ring.

CEDAR RAPIDS, IA—Pilots don't like mice roaming in their cockpits, but the input devices are now necessary for many route-planning and navigation computers.

To replace mice, Rockwell Collins has developed three new types of cursor control devices (CCDs).

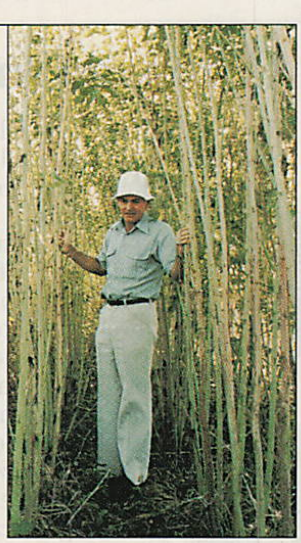
Collins says the new CCDs will be shipped this year with the company's Pro Line 21 avionics.

Everybody Loves Kenaf

AMERICUS, GA—Farmers here are eyeing kenaf, *Hibiscus cannabinus*, as a new cash crop.

The big attraction of the hardy plant, which is related to okra, is that farmers can basically plant it and forget about it. Environmentalists like kenaf because its bark can be used in place of tree pulp by the paper and newsprint industries. Makers of disposable diapers and kitty litter say the plant's highly absorbent core is ideal for their products.

Georgia farmers are growing kenaf as a commercial crop under a 4-year University of Georgia research project.



MIKE FILLON PHOTOS

Kenaf reaches its adult height of 12 to 14 ft. in about six months. It is processed using the equipment shown at left.

No Nuclear Leak, Just Tank Acting As A Barometer

RICHLAND, WA—As part of the cleanup of nuclear weapons waste at the Hanford Reservation, the Department of Energy (DOE) is cautiously transferring highly radioactive wastes from leaky underground single-shell steel tanks to more secure storage areas.

During this ticklish assignment, pumping at the 1-million-gal. SX-104 tank was abruptly halted just before Christmas after technicians observed an unexplained 3-in. drop in the waste level. After a search for a leak turned up nothing, researchers found the answer in the sky.

"Analysis of tank data and atmospheric recording showed a direct correlation between periods of high atmospheric pressure and recorded drops in the tank," says a DOE spokesman. The colossal tank had simply been acting as a giant barometer.

TECH UPDATE

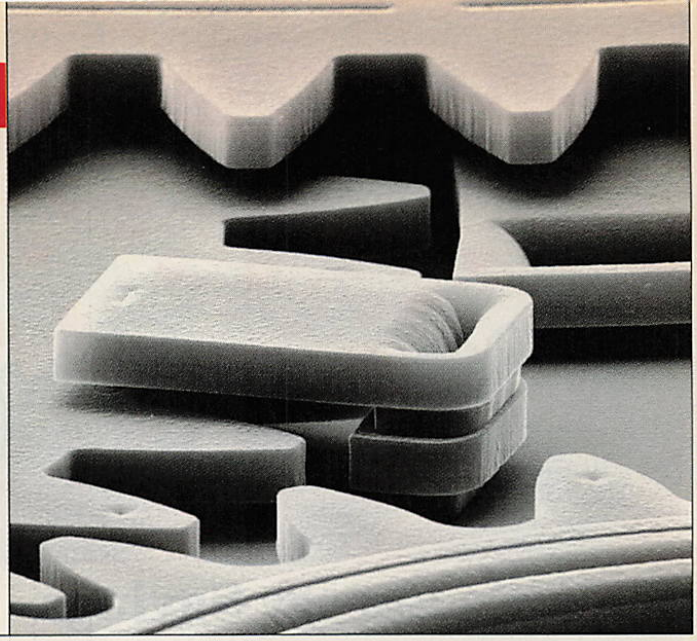
Micro-Transmission

ALBUQUERQUE, NM—Engines smaller than a grain of sand may soon be strong enough to move 1-pound objects with a little help from a new micro-transmission.

Developed by Sandia National Laboratories, the tiny silicon transmission can boost a micromachine's power by a factor of as much as 3 million.

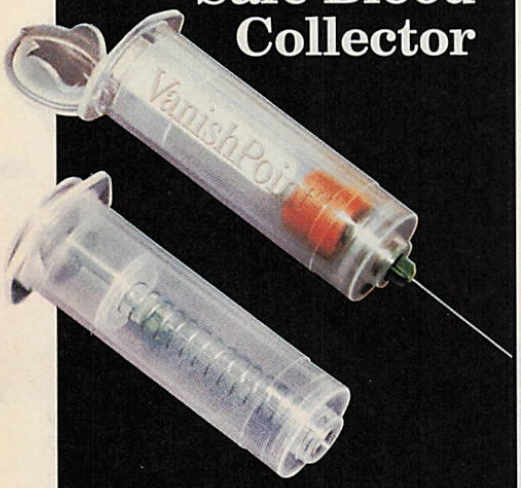
Similar to the gearshifter on a bicycle, the micro-transmission uses a series of six identical transmission systems, each with two dual-level gears. In an area less than 1 sq. millimeter—using 29 intermeshing gears—the micro-transmission achieves a 3 million:1 reduction ratio.

This much power means a promising future for micro-machine applications—especially in space, where minimizing payload weight is crucial.



SANDIA NATIONAL LABORATORIES PHOTO

Safe Blood Collector



DALLAS—More than 300 health-care workers die each year of hepatitis B or C resulting from accidental needle-prick injuries.

But a new, safer blood collector is expected to save thousands from accidental infections.

The VanishPoint syringe, developed by Retractable Technologies Inc., uses a needle that automatically retracts into a special holder after an injection is made or blood is drawn.

RETRACTABLE TECHNOLOGIES INC. PHOTO

Russo-American SST Experiments

MOSCOW—Old Cold War habits die hard, especially those involving secrets.

Though the United States and Russia are jointly studying supersonic flight using a modified 16-year-old Tupolev Tu-144D transport jet, detailed technical data on the plane's engines are strictly off limits to American researchers.

The modified aircraft is powered by four NK-321 augmented-turbofan engines—the same powerplant that's used on the modern Tu-160 Blackjack bomber.

American researchers say the restriction is a small price to pay for access to the Tu-144D—the world's only supersonic transport other than the Anglo-French Concorde.

The test plane, now being called Tu-144LL, is carrying NASA-sponsored experiments in support of its High-Speed Research (HSR) program, which began in 1990 to develop technology for a high-speed civil transport that could carry 300 people 5,000 miles at Mach 2-plus.

The purpose of the flight tests is to compare full-scale supersonic aircraft flight data with results from models in wind tunnels, computer-aided techniques and other flight tests. The six experiments on the Tu-144LL will provide data on aerodynamics, structural dynamics, acoustics and operation characteristics.

NASA PHOTO

Camera On Chip

ROCHESTER, NY—Electronic cameras may soon have all the imaging sensors and circuitry they need on a single chip.

The new chip, developed in a joint effort between Eastman Kodak and Motorola, will boost the image resolution and color quality of digital cameras and camcorders while lowering their power consumption.

Using CMOS technology, engineers integrated the digital camera circuitry that usually requires several chips—the imaging sensor array, the signal display and the analog converter—onto one chip.

EASTMAN KODAK/MOTOROLA PHOTO

Color sensitivity is strong even for blue—which is normally hard to produce with silicon chips.

The process, called ImageMOS, yields image sensitivity that's 40% better than the charge-coupled devices that current digital cameras use to capture images.

Researchers say it won't be long before digital cameras containing the chip will be available commercially.

Novel Watch

ALFORD, MA—Mixing the circular motion of a clock that has hands with the numeric precision of a digital clock, Time By Design has reinvented the watch.

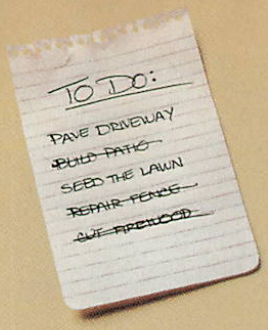
The company's Digital Watch series offers four unique ways of telling time.

The timepiece at right shows the hour in digits as the minutes and seconds tick off around it: It reads 5:20:35. Other designs are still more unusual.

Expect to see the new watches changing the face of time this year.

TIME BY DESIGN PHOTO (LEFT)

(More Tech Update on page 24)



haul some concrete.

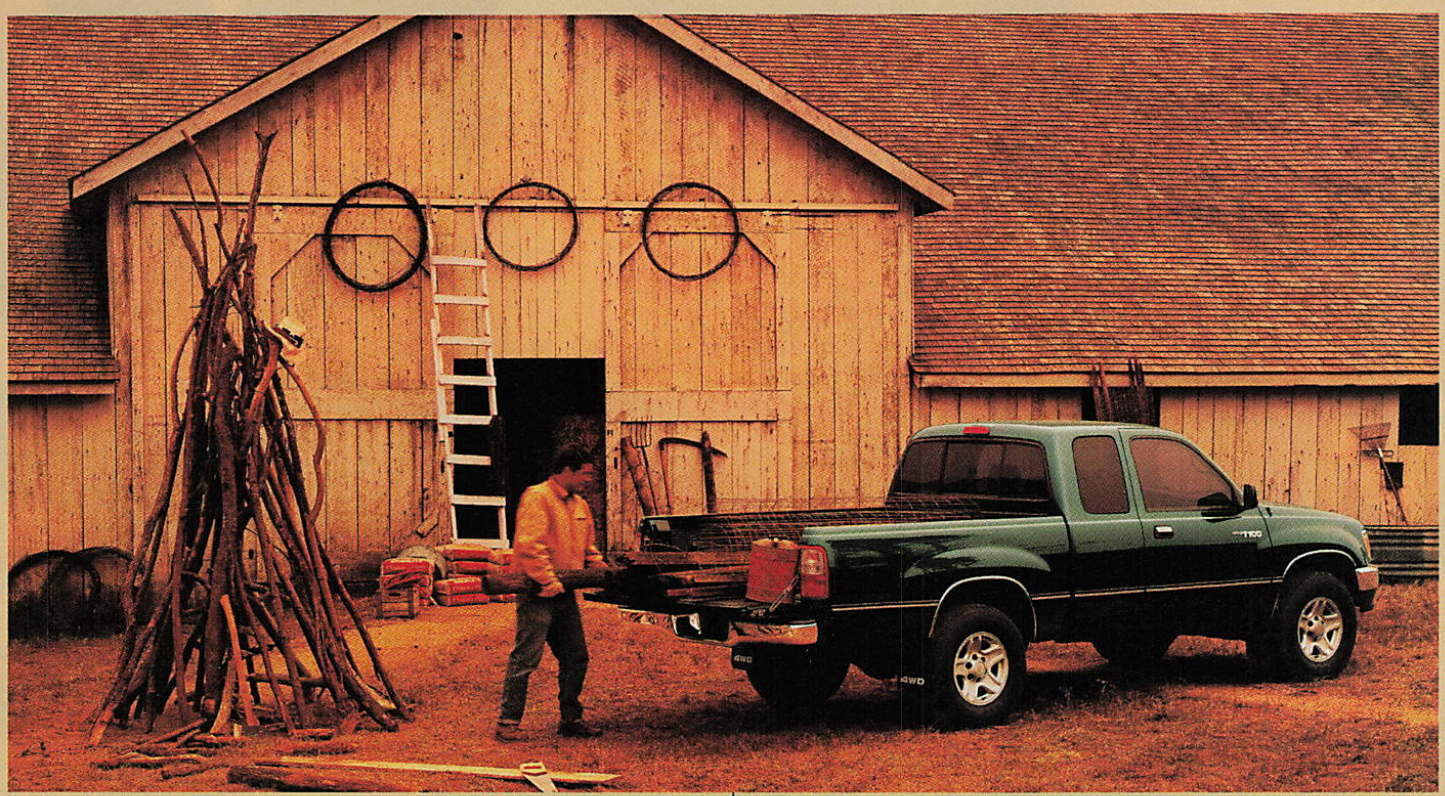
And barely break a sweat. With the largest payload of any Toyota Truck, the full-size T100 can haul

move some lumber.

loads of stuff and still leave time to achieve even loftier goals. Not too bad for a day's work.

save the world.

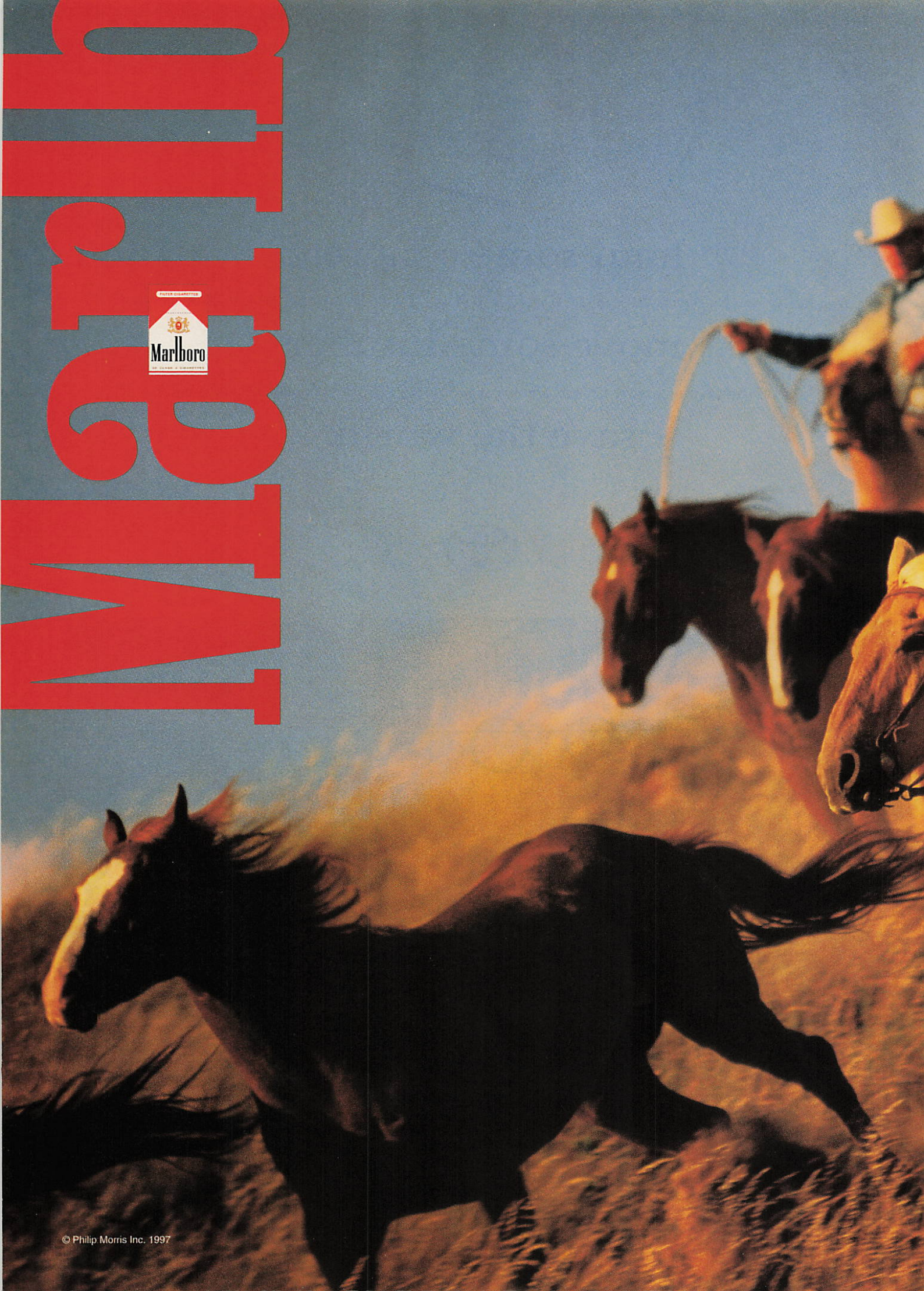
T100



TOYOTA | **EVERYDAY**

1800-GO-TOYOTA ✦ www.toyota.com

© 1997 Toyota Motor Sales, U.S.A., Inc. Buckle Up! Do it for those who love you.


Marlb
FILTER CIGARETTES
Marlboro
© Philip Morris Inc. 1997

16 mg "tar," 1.1 mg nicotine av. per cigarette by FTC method.

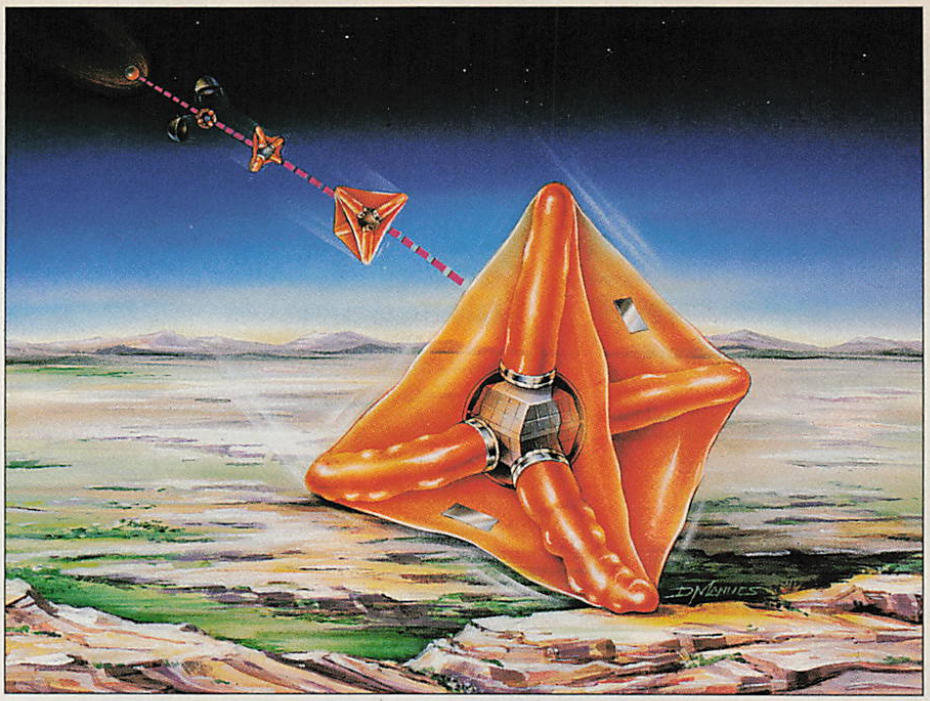
SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

Carbon-Based Electronics

MOFFETT FIELD, CA—Trading silicon for carbon will eventually make it possible to build computer chips and electronic circuits that are at least one hundred times smaller than those currently in use, say researchers at NASA's Ames Research Center.

The carbon will be used to create molecule-size pipes called nanotubes (see "Shrinking Micromachines," page 55, Nov. '97). Applying materials with different electronic properties to the ends of precisely aligned nanotubes will create molecular electronic switching, transistor and amplifying components for use in computer chips, says Deepak Srivastava, who simulated these components on a supercomputer.

"Not only will carbon-based electronic circuits be much smaller," explains NASA's Srivastava, "but they will be substantially faster and probably less expensive."



PM ILLUSTRATION BY DON MANNES

Long Legs Will Soften Hard Landings

KEMAH, TX—An inflatable landing system similar to the airbags that cushioned the Mars *Pathfinder* could protect people or payloads jettisoned from aircraft or spacecraft.

The "tetrahedral lander," developed by NASA researcher Michael L. Roberts, consists of four legs placed around a housing that contains the payload. In the case of a space vehicle, the legs would unfurl and then inflate with pressurized gas at a designated altitude after entering Earth's atmosphere.

Six triangular, drag-inducing sails, connected between the legs, deploy as the legs inflate. This slows the descent of the reentry vehicle.

Upon landing, the legs flex and splay outward to absorb impact. The housing could include an inner gimbaled portion, helping the payload to to maintain a fixed orientation with respect to Earth—particularly important if the payload is a living creature.

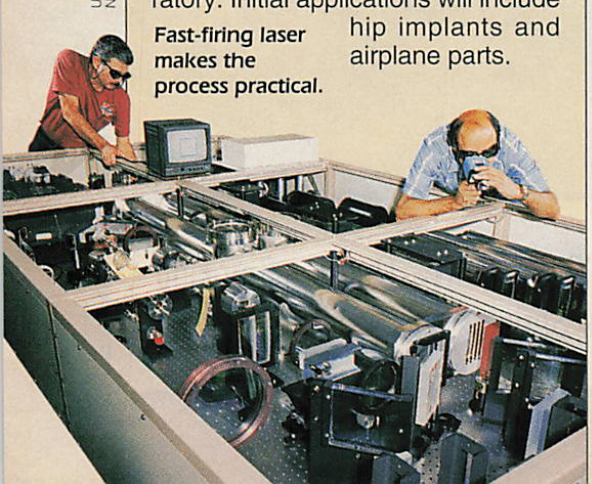
The new system has several advantages over existing designs. The entire lander opposes airflow, regardless of the position it takes with respect to the Earth. There are no parachute cables to become entangled. The landing can be accomplished on land instead of water (though the lander floats if a water landing is necessary), and there is no reliance on potentially faulty retrorockets.

Laser Peening

LIVERMORE, CA—Laser peening may at last become commercially viable.

Peening—bombarding metals with balls as small as grains of salt—induces compressive stresses that prevent metal fatigue. In the 1980s, researchers discovered that lasers could induce even higher pressures. But high costs and slow lasers made the process economically unattractive, says Jim Daly, of Metal Improvement. But now, his New Jersey-based firm will commercialize a fast-firing laser developed at the Lawrence Livermore National Laboratory. Initial applications will include hip implants and airplane parts.

Laser blasts compress the metal.



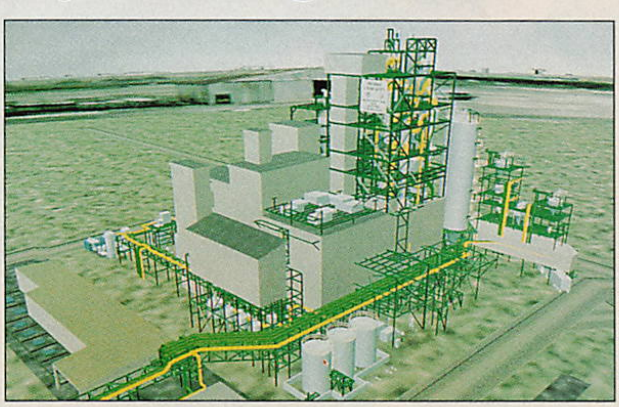
Fast-firing laser makes the process practical.

UNIVERSITY OF CALIFORNIA PHOTOS (KURT NEEB AND MARY NORTON, TOP; BRYAN QUINTARD, BOTTOM)

Management By Clicking Around

TEESSIDE, ENGLAND—Managers of an ICI plastics plant here can check up on hard-to-reach parts of their factory without leaving their desks.

VR Solutions, based in Manchester, England, has duplicated the factory in a 120MB virtual reality model that can be run on a desktop computer. Using a mouse instead of shoe leather, managers can visit any part of the plant, trace the pathways of more than 100 miles of cabling, or locate each of the factory's more than 1300 pieces of equipment.



VR SOLUTIONS ILLUSTRATION

The computer model went to work even before the plant came on line. Engineers for its design contractor, Fluor Daniel International, used it to ensure that there was sufficient space to carry out maintenance work and to check that safety signs would be visible to workers.

Stand-In For A Broken Heart

PHILADELPHIA—Many of the 4000 Americans who need new hearts won't survive the wait for transplants. For this reason, several efforts are under way to develop better heart-assist devices.

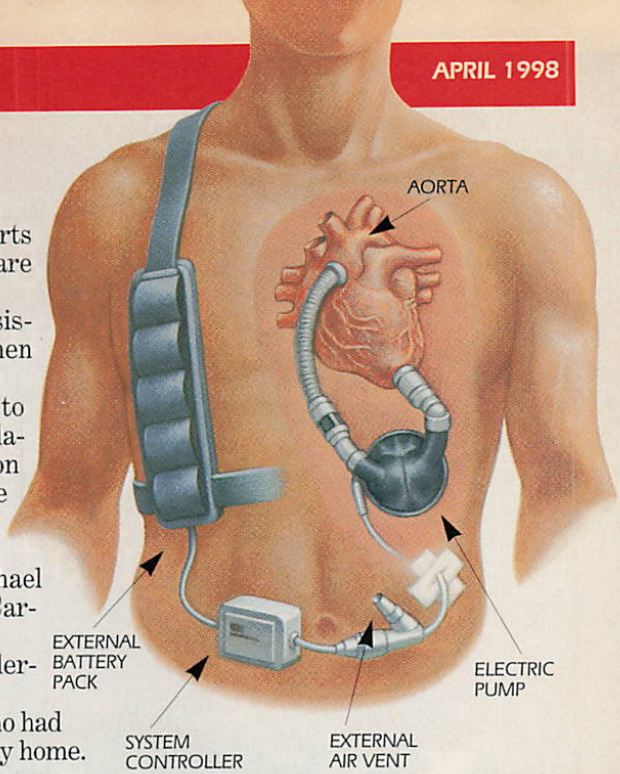
One of these products, the battery-powered Left Ventricular Assistance Device (LVAD), not only helps patients survive but may strengthen them so they can better endure transplant surgery.

The LVAD takes stress off the heart by using a mechanical pump to aid the work of a weakened left ventricle. It is sutured into the circulatory system, as shown on the right. During this operation, the surgeon also passes a thin cable through the patient's skin to connect the pump's electric motor with a small external battery pack.

Because it's easily portable, the LVAD can help some bedridden patients get on their feet and lead more independent lives, says Michael Acker, director of the University of Pennsylvania Medical Center's Cardiac Transplant Program, where the device underwent clinical trials.

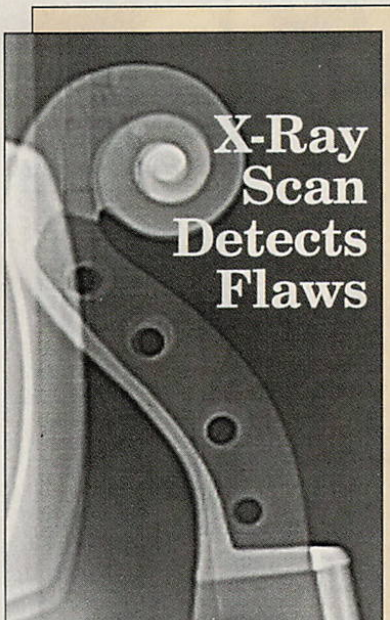
"It also allows them to rehabilitate so that they are better able to tolerate the heart transplant surgery when it finally does occur," he says.

One of the biggest advantages of LVAD, says Acker, is that patients who had previously been hospital-bound while waiting for a transplant can now stay home.



PM ILLUSTRATION BY GREG SCOTT

X-Ray Scan Detects Flaws



MINNEAPOLIS—If you are thinking about buying a Stradivarius or any other type of rare violin, you might want to consult a radiologist first.

"Damage to these instruments may considerably diminish their value and their tonal quality," says Steven A. Sirr. A radiologist at Abbot Northeastern Hospital, Sirr examines rare antique instruments with the same computed tomography (CT) scanners used to diagnose diseases and injuries in humans.

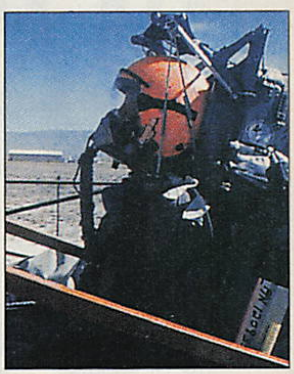
Sirr says that CT images, like the one shown here, can reveal hidden faults in $1 million-plus instruments. "A crack in a sound post region of the back plate of a violin decreases the value by 50%," he explained at the last annual meeting of the Radiological Society of North America.

And, if you actually are willing to drop $1 million on an old violin, you might also ask Sirr to do a CT scan of your brain.

STEVEN A. SIRR PHOTO

Bailing Out At Mach 1-Plus

HOLLOMAN AFB, NM—Anticipating that ejecting at Mach 1-plus speeds may someday become routine, researchers at the Aeronautical Systems Center have developed a rocket-stabilized ejection seat.



Known as 4th Gen, the seat is designed to show that computer-controlled, rocket-powered propulsion systems can be used to safely stabilize a pilot during extreme situations, such as high-speed ejections at low altitudes, explains Lt. Col. Marty Battes, who headed the Air Force test program.

During the final experiment in a 5-year test program, 4th Gen safely launched an instrumented mannequin from a rocket-powered sled traveling at Mach 1.04 (left). Although there are no immediate plans to begin replacing current ejection seats, data from this and earlier tests may be used to design new seats for T-4s, F-14s, and F-18s.

ADAM, the advanced dynamic anthropomorphic mannequin, bails out.

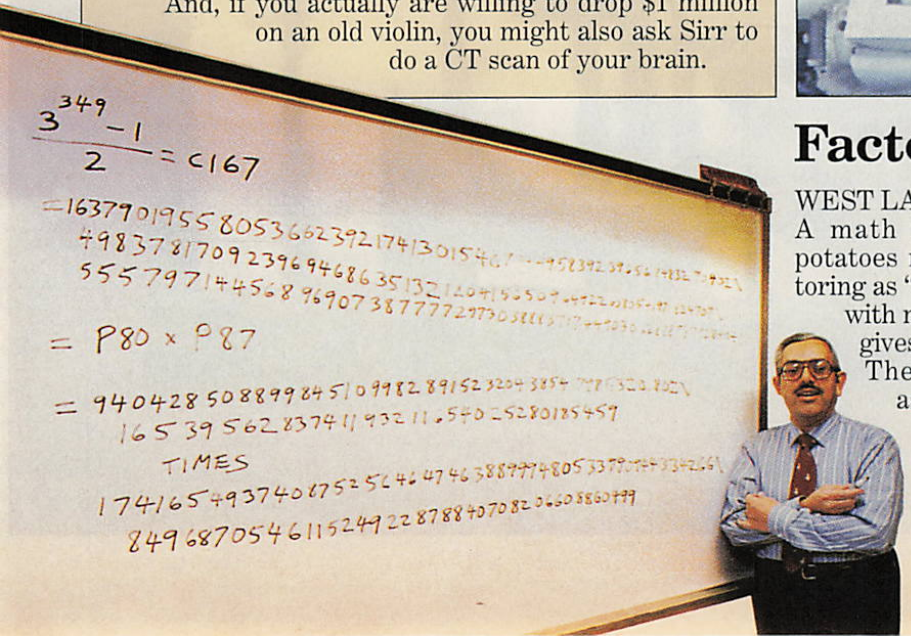
USAF PHOTOS

Factoring A Giant Number

WEST LAFAYETTE, IN—A math book for couch potatoes might define factoring as "Jeopardy" played with numbers. The host gives the answer: "35." The winning player asks: "What are 5 and 7?"

In the latest round, the 167-digit number at the top of the white board (left) was factored into the 80- and 87-digit numbers below it.

It may all sound like fun (well, sort of), but factoring has a serious purpose, says Samuel Wagstaff, of Purdue University. "Knowing the limits of such factorization is essential to developing secure codes and ciphers."



PURDUE UNIVERSITY PHOTO

(More Tech Update on page 29)

"I eat right and exercise to control my high cholesterol.

Why should I worry about a first heart attack?"

©1998 Bristol-Myers Squibb Company, Princeton, NJ 08543

Diet and exercise may not be enough.

Pravachol reduces the risk of a first heart attack up to one-third.

Talk to your doctor about Pravachol. Lots of medications can lower cholesterol, but with Pravachol there's more. It is the only cholesterol-lowering drug of its kind proven to help prevent first heart attacks. Improving your diet and exercise is an important first step, but may not be enough. So ask your doctor about adding Pravachol to your diet and exercise regimen. In clinical studies, Pravachol has been taken by more people over a longer period of time than any other medication of its kind. Along with diet and exercise, Pravachol has been prescribed for millions of men and women. Pravachol. It could help you live a longer, healthier life.

❁ ❁ ❁

Pravachol, in combination with diet and exercise, is proven to reduce the risk of a first heart attack, reduce the risk of death from heart disease and the need for heart surgery (such as bypass or angioplasty) based on a landmark study including over 6,500 males with high cholesterol and no evidence of heart disease. Because Pravachol is a prescription drug, you should ask your doctor or healthcare professional if Pravachol is right for you. As with most medications, Pravachol isn't for everyone, including women who are pregnant or nursing, or may become pregnant, people who are allergic to any of its ingredients or by anyone with liver disease. Your doctor may do simple blood tests to check your liver function before and during treatment with Pravachol. Some mild side effects, such as slight rash or stomach upset, occur in about 2–4% of patients. Muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. Be sure your doctor knows about other medications you may be taking in order to avoid any possible serious drug interactions. Please see important information on the next page. Ask your doctor if Pravachol is right for you. For more information on first heart attack prevention, call

1-800-PREVENT.

Visit our Web site at www.pravachol.com

PRAVACHOL®
pravastatin sodium 20 mg tablets

Proven to help prevent a first heart attack.

PRAVACHOL®

Pravastatin Sodium Tablets

CONTRAINDICATIONS: Hypersensitivity to any component of this medication. Active liver disease or unexplained, persistent elevations in liver function tests (see **WARNINGS**). *Pregnancy and lactation.* Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. **Pravastatin should be administered to women of childbearing age only when such patients are highly unlikely to conceive and have been informed of the potential hazards.** If the patient becomes pregnant while taking this class of drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

WARNINGS: Liver Enzymes: HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the US over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients. In the largest long-term placebo-controlled clinical trial with pravastatin (Pravastatin Primary Prevention Study; See **Clinical Pharmacology**), the overall incidence of AST and/or ALT elevations to greater than three times the upper limit of normal was 1.05% in the pravastatin group as compared to 0.75% in the placebo group. One (0.03%) pravastatin-treated patient and 2 (0.06%) placebo-treated patients were discontinued because of transaminase elevations. Of the patients with normal liver function at week 12, three of 2875 treated with pravastatin (0.10%) and one of the 2919 placebo patients (0.03%) had elevations of AST greater than three times the upper limit of normal on two consecutive measurements and/or discontinued due to elevations in transaminase levels during the 4.8 years (median treatment) of the study. **It is recommended that liver function tests be performed prior to and at 12 weeks following initiation of therapy or the elevation of dose.** Patients who develop increased transaminase levels or signs and symptoms of liver disease should be monitored with a second liver function evaluation to confirm the finding and be followed thereafter with frequent liver function tests until the abnormality(ies) return to normal. Should an increase in AST or ALT of three times the upper limit of normal or greater persist, withdrawal of pravastatin therapy is recommended. Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see **CONTRAINDICATIONS**). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see **CLINICAL PHARMACOLOGY: Pharmacokinetics/Metabolism**). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect. **Skeletal Muscle: Rare cases of rhabdomyolysis with acute renal failure secondary to myoglobinuria have been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see **ADVERSE REACTIONS**). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper normal limit, was rare (< 0.1%) in pravastatin clinical trials. Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.** The risk of myopathy during treatment with another HMG-CoA reductase inhibitor is increased with concurrent therapy with either erythromycin, cyclosporine, niacin, or fibrates. However, neither myopathy nor significant increases in CPK levels have been observed in three reports involving a total of 100 post-transplant patients (24 renal and 76 cardiac) treated for up to two years concurrently with pravastatin 10-40 mg and cyclosporine. Some of these patients also received other concomitant immunosuppressive therapies. In one single-dose study, pravastatin levels were found to be increased in cardiac transplant patients receiving cyclosporine. Further, in clinical trials involving small numbers of patients who were treated concurrently with pravastatin and niacin, there were no reports of myopathy. Also, myopathy was not reported in a trial of combination pravastatin (40 mg/day) and gemfibrozil (1200 mg/day), although 4 of 75 patients on the combination showed marked CPK elevations versus one of 73 patients receiving placebo. There was a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy (see **PRECAUTIONS: Drug Interactions**). **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should be avoided unless the benefit of further alterations in lipid levels is likely to outweigh the increased risk of this drug combination.**

PRECAUTIONS: General: Pravastatin may elevate creatinine phosphokinase and transaminase levels (see **ADVERSE REACTIONS**). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin. *Homozygous Familial Hypercholesterolemia.* Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors. *Renal Insufficiency.* A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life (t½) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored. **Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin:* See **WARNINGS: Skeletal Muscle**. *Antipyrine:* Since concomitant administration of pravastatin had no effect on the clearance of antipyrine, interactions with other drugs metabolized via the same hepatic cytochrome isozymes are not expected. *Cholestyramine/Colestipol:* Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect. (See **DOSAGE AND ADMINISTRATION: Concomitant Therapy**.) *Warfarin:* In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed. *Cimetidine:* The $AUC_{0\text{-}12\ hr}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid. *Digoxin:* In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SQ 31,906 and SQ 31,945 was not altered. *Cyclosporine:* Some investigators have measured cyclosporine levels in patients on pravastatin, and to date, these results indicate no clinically meaningful elevations in cyclosporine levels. In one single-dose study, pravastatin levels were found to be increased in cardiac transplant patients receiving cyclosporine. *Gemfibrozil:* In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SQ 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended. In interaction studies with *aspirin, antacids* (1 hour prior to PRAVACHOL), *cimetidine, nicotinic acid,* or *probucol,* no statistically significant differences in bioavailability were seen when PRAVACHOL (pravastatin sodium) was administered. *Other Drugs:* During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to: diuretics, antihypertensives, digitalis, ACE inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin. **Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chorionic gonadotropin was significantly reduced ($p < 0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥ 50% rise in plasma testosterone after human chorionic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones. **CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class. A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg/day dose. **Carcinogenesis, Mutagenesis, Impairment of Fertility:** In a 2-year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p < 0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC. The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times the human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p < 0.05$). The incidence was not dose-related and male mice were not affected. A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Harderian gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls. No evidence of mutagenicity was observed *in vitro,* with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*; a forward mutation assay in L5178Y TK +/- mouse lymphoma cells; a chromosomal aberration test in hamster cells; and a gene conversion assay using *Saccharomyces cerevisiae.* In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice. In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear. **Pregnancy: Pregnancy Category X.** See **CONTRAINDICATIONS**. Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20x (rabbit) or 240x (rat) the human exposure based on surface area ($mg/meter^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. There has been one report of severe congenital bony deformity, tracheo-esophageal fistula, and anal atresia (Vater association) in a baby born to a woman who took another HMG-CoA reductase inhibitor with dextroamphetamine sulfate during the first trimester of pregnancy. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL (pravastatin sodium), it should be discontinued and the patient advised again as to the potential hazards to the fetus. **Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see **CONTRAINDICATIONS**). **Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time.

ADVERSE REACTIONS: Pravastatin is generally well tolerated; adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients. **Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below; also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug:

	All Events		Events Attributed to Study Drug	
Body System/Event	**Pravastatin (N = 900) %**	**Placebo (N = 411) %**	**Pravastatin (N = 900) %**	**Placebo (N = 411) %**
Cardiovascular				
Cardiac Chest Pain	4.0	3.4	0.1	0.0
Dermatologic Rash	4.0*	1.1	1.3	0.9
Gastrointestinal				
Nausea/Vomiting	7.3	7.1	2.9	3.4
Diarrhea	6.2	5.6	2.0	1.9
Abdominal Pain	5.4	6.9	2.0	3.9
Constipation	4.0	7.1	2.4	5.1
Flatulence	3.3	3.6	2.7	3.4
Heartburn	2.9	1.9	2.0	0.7
General				
Fatigue	3.8	3.4	1.9	1.0
Chest Pain	3.7	1.9	0.3	0.2
Influenza	2.4*	0.7	0.0	0.0
Musculoskeletal				
Localized Pain	10.0	9.0	1.4	1.5
Myalgia	2.7	1.0	0.6	0.0
Nervous System				
Headache	6.2	3.9	1.7*	0.2
Dizziness	3.3	3.2	1.0	0.5
Renal/Genitourinary				
Urinary Abnormality	2.4	2.9	0.7	1.2
Respiratory				
Common Cold	7.0	6.3	0.0	0.0
Rhinitis	4.0	4.1	0.1	0.0
Cough	2.6	1.7	0.1	0.0

*Statistically significantly different from placebo.

In the Pravastatin Primary Prevention Study (West of Scotland Coronary Prevention Study) (see **CLINICAL PHARMACOLOGY: Clinical Studies**) involving 6595 patients treated with PRAVACHOL (pravastatin sodium) (N = 3302) or placebo (n = 3293) the adverse event profile in the pravastatin group was comparable to that of the placebo group over the median 4.8 years of the study. The following effects have been reported with drugs in this class; not all the effects listed below have necessarily been associated with pravastatin therapy: *Skeletal:* myopathy, rhabdomyolysis, arthralgia. *Neurological:* dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy, anxiety, insomnia, depression. *Hypersensitivity Reactions:* An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, dermatomyositis, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, eosinophilia, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome. *Gastrointestinal:* pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma; anorexia, vomiting. *Skin:* alopecia, pruritus. A variety of skin changes (e.g., nodules, discoloration, dryness of skin/mucous membranes, changes to hair/nails) have been reported. *Reproductive:* gynecomastia, loss of libido, erectile dysfunction. *Eye:* progression of cataracts (lens opacities), ophthalmoplegia. *Laboratory Abnormalities:* elevated transaminases, alkaline phosphatase, and bilirubin; thyroid function abnormalities. **Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see **WARNINGS**). Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with HMG-CoA reductase inhibitors. **Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL-cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination or in addition to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See **WARNINGS: Skeletal Muscle** and **PRECAUTIONS: Drug Interactions**.)

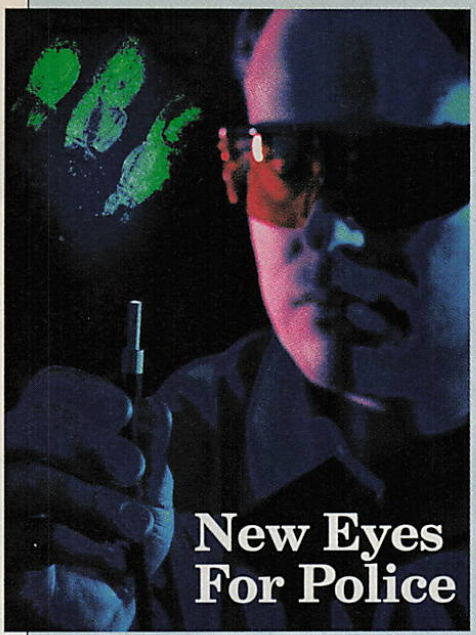
OVERDOSAGE: To date, there are two reported cases of overdosage with pravastatin, both of which were asymptomatic and not associated with clinical laboratory abnormalities. If an overdose occurs, it should be treated symptomatically and supportive measures should be instituted as required.

CAUTION: Federal (USA) law prohibits dispensing without prescription.

Revised April 1997
D3-B001-4-97

Bristol-Myers Squibb Company
Princeton, NJ 08543

J4-538F



New Eyes For Police

RANDY MONTOYA PHOTO

ALBUQUERQUE, NM—Latent fingerprints and body fluids left at crime scenes often escape the attention of detectives because tools that make them visible are too expensive for many police departments.

Sandia National Laboratories says its new portable evidence detector (PED) can see what the sharpest eyes miss. Organic compounds give off fluorescent emissions that are too weak to be seen in normal light, explains a lab spokesman. PED uses a rapidly flashing lamp and modified 3D computer goggles to cancel out the background, making the weak light visible, as shown above.

The lab is currently building a field unit that Albuquerque police will test at real crime scenes.

Biggest Air Force Satellite

USAF/PHILLIPS LABORATORY PHOTO

SEAL BEACH, CA—The Air Force is preparing to launch its largest and most complex satellite, the advanced research and global observation satellite (ARGOS).

Nine experiments aboard ARGOS will, among other things, test new superconducting materials and sensors for the planned international space station. Instruments will also collect data that will be used to improve predictions of "space weather" and the reentry paths of warheads, old satellites and other space junk. "We'll be relaying an unprecedented 9.6GB of data a day," says Capt. Gregory Settles, project manager.

Two international hitchhikers, Denmark's Orsted and South Africa's Sunsat scientific satellites, will share the ride with ARGOS when it lifts off from Vandenberg Air Force Base, in California, aboard a Delta II rocket late this summer.

Capacitor Replaces Truck Battery

ARCATA, CA—You probably noticed the high cost of recycling lead when you last bought a battery for your car or truck.

Larry Schlussler, a designer for Sun Frost refrigerators, wants to get the lead out for good. He replaced his truck battery with a 150-farad capacitor that stores energy for startups. The alternator recharges it—a solar cell keeps it topped.

The Russian-made capacitors could be sold in the United States later this year.

Video Helps Kitbuilders Take Off

ROTORWAY INTERNATIONAL PHOTO

CHANDLER, AZ—If you are thinking about building your own helicopter but aren't sure your mechanical skills are up to the task, a video could help you decide.

RotorWay International has produced an 8-part series that follows the construction of one of its Exec 162F choppers (shown here). The 10-hour presentation shows the assembly process from builder orientation through the first engine startup and rotor-system testing and tracking.

RotorWay tells PM the video will shorten the typical 300 hours it takes to assemble the helicopter, while improving the quality of the builder's workmanship.

Listening For Nuclear Trouble

STARKVILLE, MS—Computer sound cards aren't just for fun. Mississippi State University researchers say they can prevent explosions in barrels holding nuclear waste.

As slightly radioactive waste stored in 55-gal. drums breaks down, pressure builds up. Damaged or mishandled drums can explode, says John Plodinec, of the university's Diagnostic Instrumentation and Analysis Laboratory (DIAL).

DIAL's portable drum "thunker" places a microphone next to the drum, and then it lightly strikes the drum. A sound card converts what it hears into signals a laptop computer can analyze for signs of dangerous pressure changes. The thunker has been tested at a Kentucky waste site.

Road Hog King

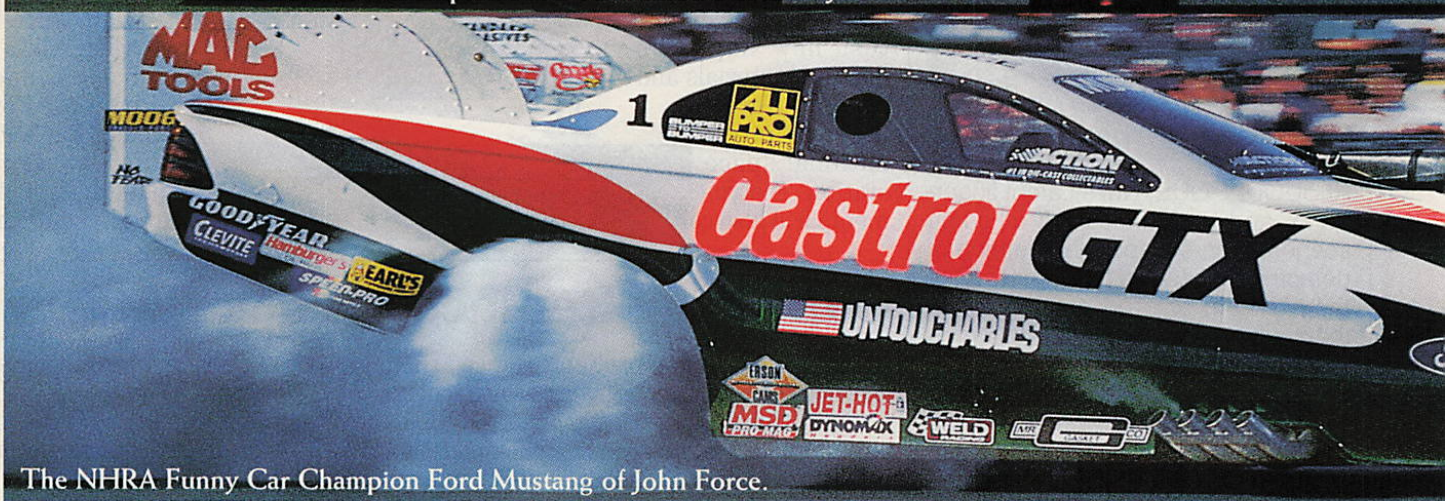
CHAMPS SUR YONNE, FRANCE—You'll need lots of room to pass the newest trailer from Nicolas Industrie. It's a 187-ft.-long 96-wheeler.

All of the trailer's axles are steered and equipped with hydraulic, swing-axle suspension for off-road use. The trailer has a modular design that permits it to be reconfigured for 40- to 388-ton loads.

Statnett, the Norwegian gas and electric utility that purchased the trailer, plans to use it to haul transformers to generation plants and substations. TU

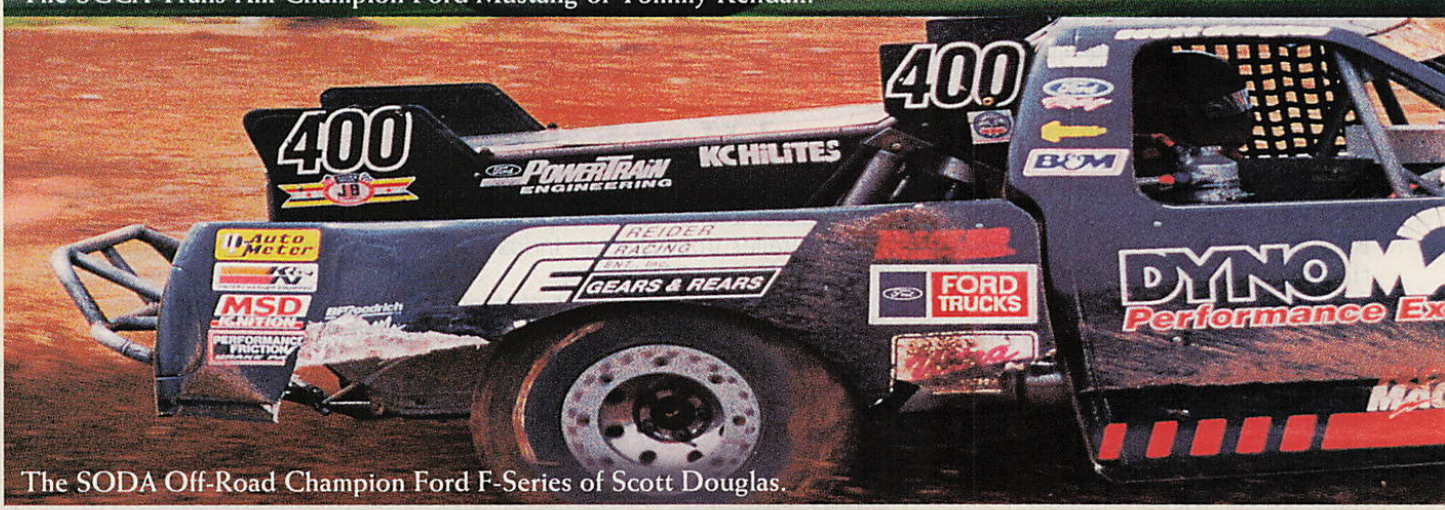
FRENCH TECHNOLOGY PRESS OFFICE PHOTO

The NASCAR Manufacturer's Champion Ford Thunderbird of Dale Jarrett.

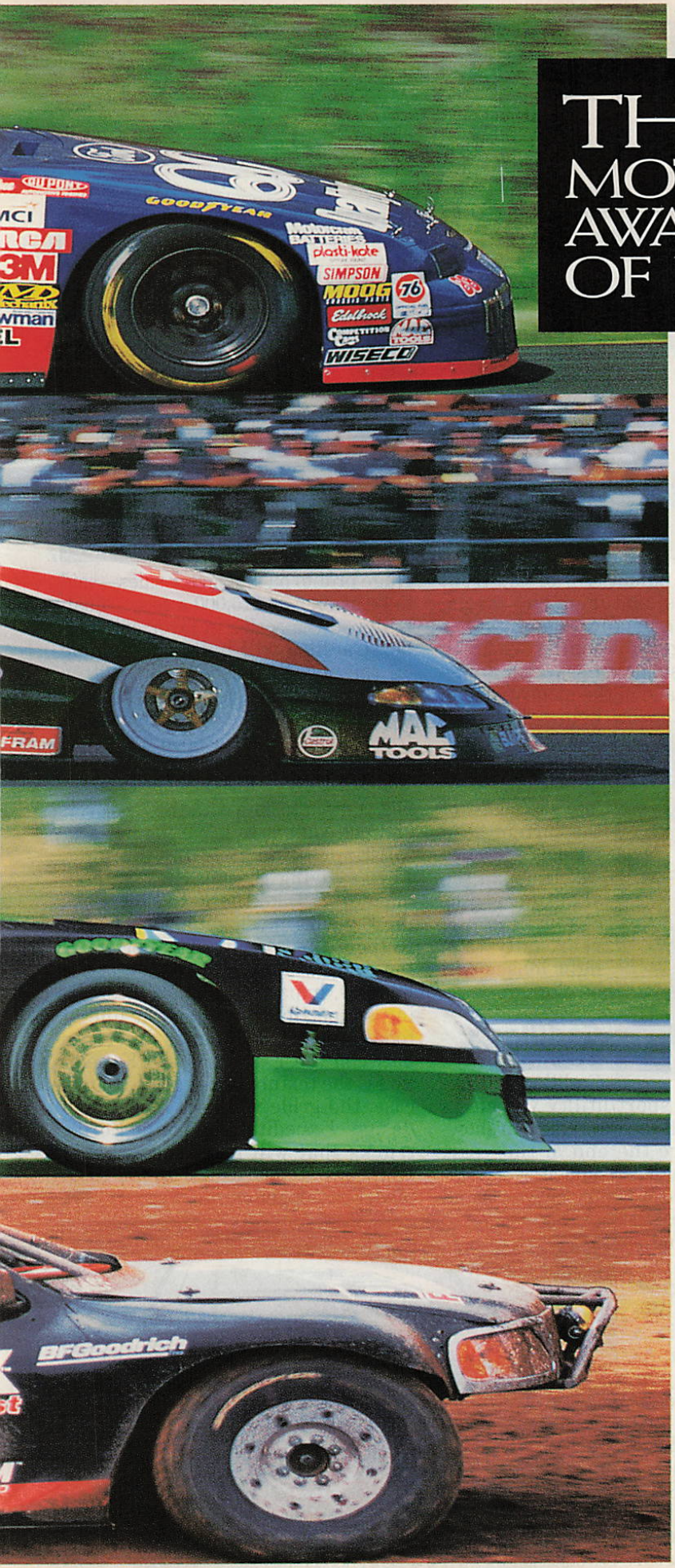


The NHRA Funny Car Champion Ford Mustang of John Force.

The SCCA Trans-Am Champion Ford Mustang of Tommy Kendall.



The SODA Off-Road Champion Ford F-Series of Scott Douglas.



THE BIGGEST MOTION PICTURE AWARDS THIS SIDE OF HOLLYWOOD

The envelope, please. Or, to put it in racing terms – the envelope Ford pushed all year long to amaze and delight audiences from Daytona to Baja to Surfer's Paradise, Australia. Best Performance in a Lead Role? See the pictures to the left and you'll note we took home that honor four times. Best Supporting Performance? Thanks to the midnight oil-burning work of our team owners, engineers, pit crews and sponsors, we pretty much ran away with that one, too. And at Ford, when all the scenes were wrapped, we took on the role of delivering our winning technology ideas to the cars and trucks you can drive. Hey, looks like we can really act.

Ford

WE RACE. YOU WIN.™

Detroit Spy Report

BY JIM DUNNE, Detroit Editor

1999 Chevrolet Impala

● Though the rear-wheel-drive Chevrolet sedan is a thing of the past, for now, at least the full-size Chevy is not. The bow-tie division reenters that market segment with a stretched version of its front-drive Malibu platform. The car will be a 1999 model and it'll be called Impala. Besides a longer wheelbase, the car will be differentiated from the Malibu by its new body panels and more powerful V6 engine. Look for Chevy to undercut Ford's Crown Victoria in price. The photo shows a partially disguised Impala undergoing drivetrain testing on a GM proving-ground track.

CHEVROLET IMPALA

PM PHOTO BY NICHOLAS TWORK

FORD EXPLORER

PM PHOTO BY NICHOLAS TWORK

Cheap Corvette

Rumors in Detroit have Chevy coming out with a stripped, low-price Corvette next year, the so-called hardtop version. But Corvette insiders say no. The hardtop will have all the amenities—things like power windows and locks—that the current models offer. As for performance, the hardtop may be a bit quicker, thanks to its slight weight advantage. Interestingly, Europeans are in awe of the Corvette's performance, driving perks and price. They see it as the equal of European exotics, but at a huge bargain in price.

1999 Ford Explorer

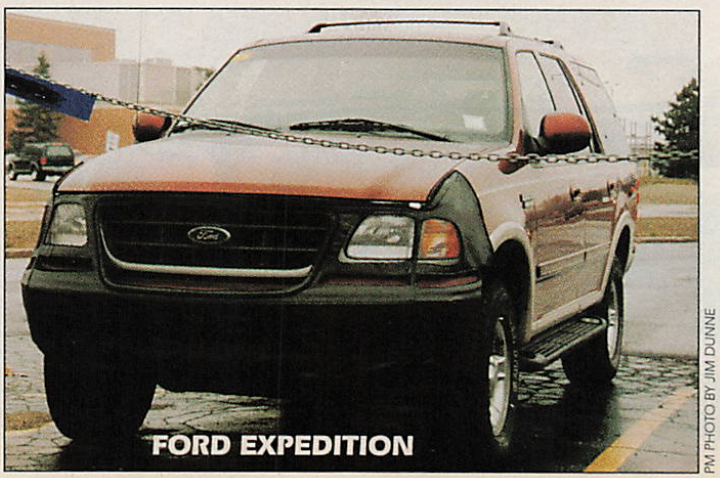
Ford will offer a facelifted Explorer next year as part of a scheduled freshening of the best-selling SUV. Not wanting to possibly mess with what's clearly a winning formula, the changes are minor. All of the front end changes center on the fascia. They include smaller headlights, a more oval grille opening with the smiley-face shape erased, and a narrower air intake in the modesty panel below the steel-bumper. All of the grille and headlight changes fit into the shape of the current hood and fenders. Ford will leave all the sheetmetal unchanged. At the rear, only taillight lenses will be altered.

Cadillac's SUV

Cadillac will unveil its new sport/utility vehicle in August. You'll see the vehicle in showrooms before the end of the year. What Cadillac has planned is a Navigator-fighter—a luxury SUV with all the upscale cabin trimmings and a high-performance V8 engine. For General Motors, this is a quick U-turn. As recently as a year ago GM executives were opposed to Cadillac proposals to get into the SUV market. But Lincoln's success with Navigator changed all that. Huge profits on Navigator sales—said to be as high as $15,000 a copy—finally tipped the scales in favor of Cadillac. Cadillac will build the vehicle off the new Yukon body, but with a Cadillac grille and trimming. There is a possibility that the Northstar powertrain will be under the hood.

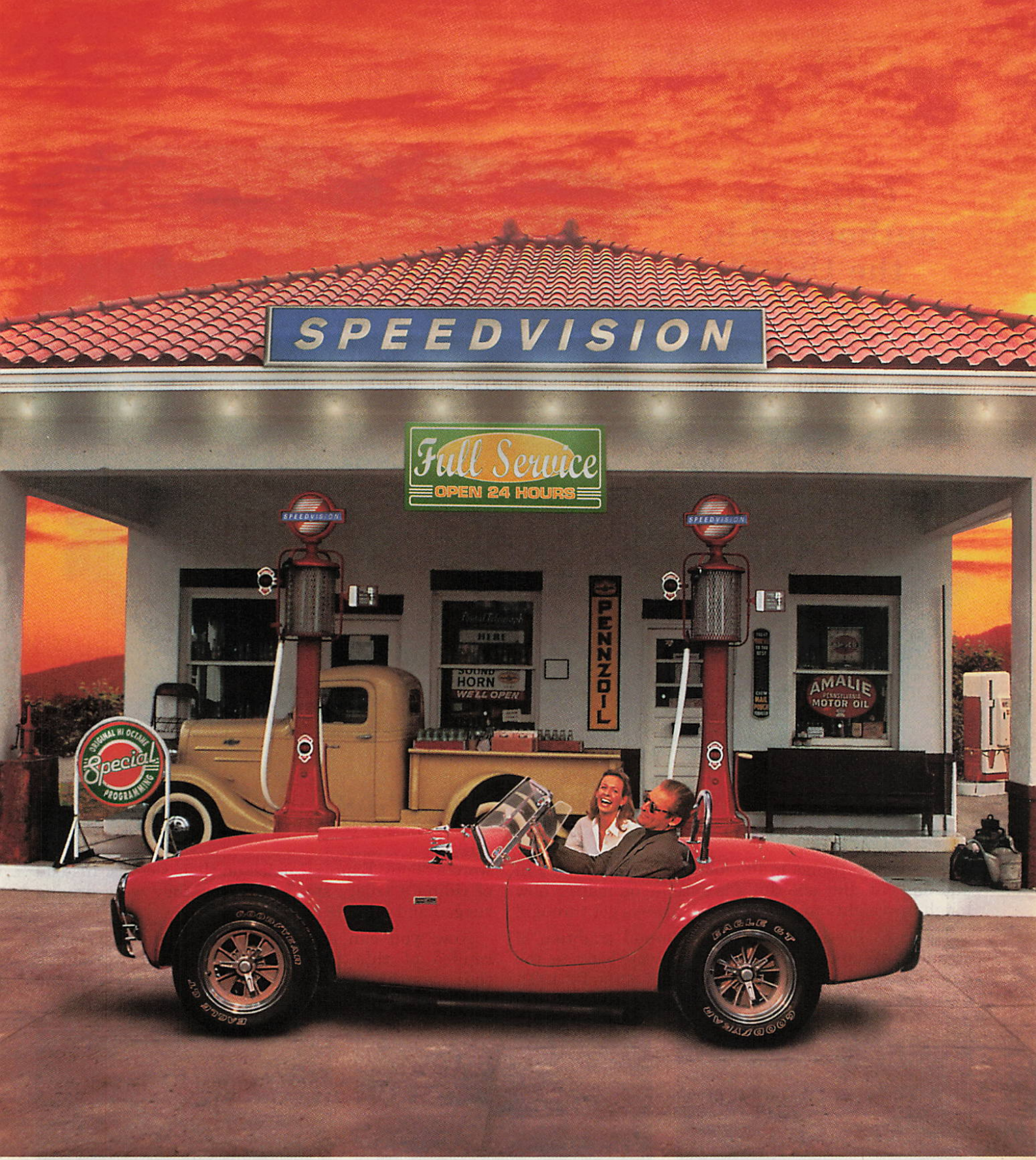
1999 Ford Expedition

Not content to stop with the Explorer, and not content to leave the hot-selling Expedition as is for too long, Ford's giving the big SUV a small makeover. Like the F-150 for 1999, the Expedition will get a deeper drop to the grille opening. The bottom of the grille will dip into the top of the bumper, imparting a more interesting shape than the straight line of today's model. The major difference between the F-150 and the Expedition is the texture of the grille. In this case, the grille will be a honeycomb design. Expedition is one of Ford's trucks that will meet the exhaust emissions standards set up for 1999-model passenger cars. **PM**



FORD EXPEDITION

PM PHOTO BY JIM DUNNE



© Speedvision® 1998

Speedvision. The first full-service network devoted to the things you love most 24 hours a day: cars, boats planes and motorcycles. It's where you'll find programs like *AutoWeek on Speedvision*, *American Hot Rodder* and *Bike Week*. Instructional shows that provide expert's tips for top performance. Historical programs from Speedvision's rare archives like *Legends of Motorsports*, live coverage of special events like the *Barrett-Jackson Car Auction*. And for race fans, the most comprehensive coverage of motorsports on TV.

So don't go another day without it. To get Speedvision added to your cable channel line-up, call 1-888-22-SPEED.

SPEEDVISION®

Catch Us If You Can!
Call 1-888-22 SPEED

THE 1931 U.S. MAIL® TRUCK

Officially authorized by the USPS!

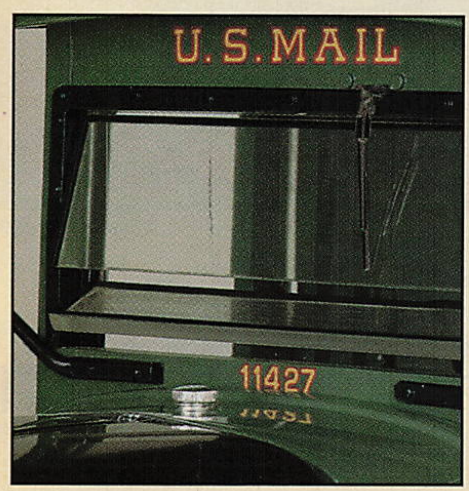
Shown approximately actual size (Scale 1:24; 6¾" in length).

A collector-quality replica crafted of die-cast metal from over 150 individual parts.

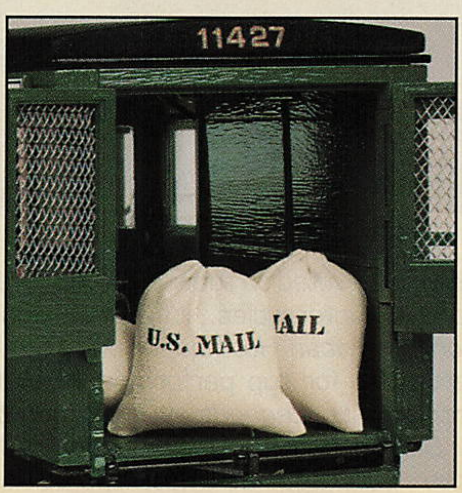
There are few things in life folks can count on day in and day out. But one thing is sure — no matter how tough the conditions, the mail will always get through!

The U.S. Postal Service has a proud tradition of steadfast reliability dating all the way back to the glory days of the Pony Express in the 1800's. By 1931, although the ponies were long gone, the couriers still wore a "Pony Express" patch on their sleeves. Instead of riding a trusty steed, however, they were driving rugged and reliable mail trucks.

Now, you can own an authentic die-cast metal replica of this handsome mechanical workhorse that was the pride of the U.S. Postal Service...the *1931 U.S. Mail Truck.*



The split front windshield pushes out for ventilation, just like the original truck.



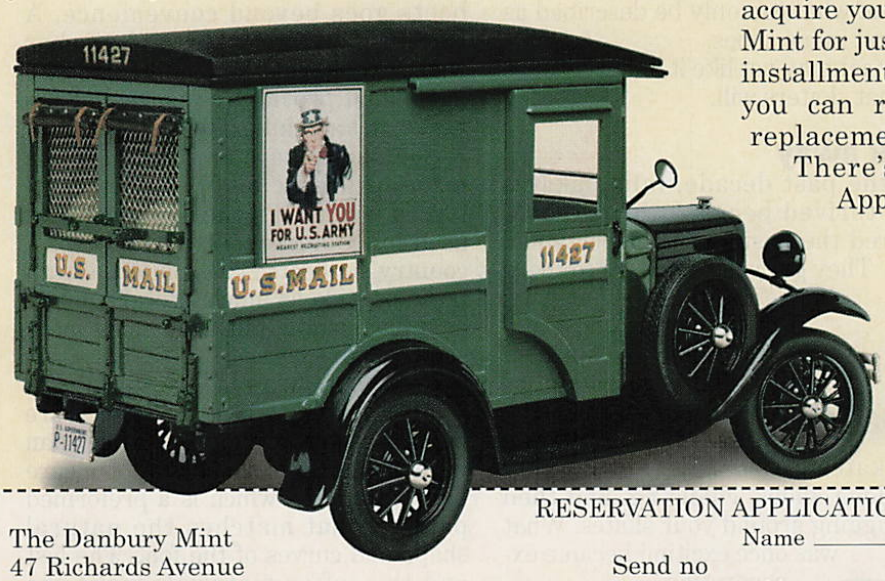
The rear doors swing open on precision hinges. The tailgate drops down smoothly.

The driver's side window swings open on miniature hinges.

Through rain, sleet or snow, it always delivered!

Meticulously crafted.

This beautiful replica is crafted in large 1:24 scale from more than 150 precision parts. You'll be delighted at the authentic detail and many moving parts. The "louvered" hood opens to reveal a beautifully crafted miniature 4-cylinder engine, and both front doors slide open to show authentic dashboard gauges and a removable fire extinguisher. You can lift the driver's seat to reveal a miniaturized "tool kit," and you can open the rear doors and drop down the tailgate for access to the detailed rear compartment and sliding interior door. You'll even find eight removable mail sacks!



Attractively priced; satisfaction guaranteed.

An original 1931 U.S. Mail Truck would be a star attraction at any antique auto show...and this authentic reproduction will also be the envy of anyone who sees it displayed in your home or office. You can acquire your *1931 U.S. Mail Truck* from the Danbury Mint for just $129, payable in five convenient monthly installments of $25.80*. If not completely satisfied, you can return your replica within 30 days for replacement or refund, whichever you prefer. There's no risk, so mail your Reservation Application today!

*Plus any applicable sales tax and $1.20 shipping and handling per installment.

UNITED STATES POSTAL SERVICE®
Official Licensed Product

TM & © 1998 USPS. All rights reserved.
Produced under license by The Danbury Mint.

RESERVATION APPLICATION

The Danbury Mint
47 Richards Avenue
Norwalk, CT 06857

Send no money now.

THE 1931 U.S. MAIL TRUCK

Yes! Reserve my *1931 U.S. Mail Truck* as described in this announcement.

Name _____
Please print clearly.

Address _____

City _____ State _____ Zip _____

Signature _____
(Orders subject to acceptance.)

Allow 4 to 8 weeks after initial payment for shipment.

0631IPB2

Walk 'N' Roll

BY JIM GORANT, Outdoors Editor

● The cat has somehow squeezed behind the couch. Over time he's learned to live with the sound and spectacle of my size 13s coming at him across the floor, but this is just too much.

I can't say that I blame him. What he's seeing and hearing goes beyond my normal big-footed ballet. Today, I'm trying out a pair of shoes that touch down with all the subtlety of an Arnold Schwarzenegger movie and look like something a Power Ranger would wear to play basketball.

But these boots may be the best things to hit roller skating since someone decided to put all the wheels in a line. While they're not exactly great for strolling, in less than 30 seconds I can clamp a set of inline wheels to the bottom and skate off into the sunset.

Hypno's Cardio series does its best to imitate a typical workout shoe.

Although people have built clamp-on skates before—usually some lame spring-loaded thing that went right over your shoes—no one has ever done it like this. Two companies, Rossignol (802/863-2511) and Hypno (802/655-1500), now offer versions of what can only be described as the first inline shoes.

My cat may not like it, but it's a sure bet that skaters will.

Walk away

For the past decade, inline skates have thrived because they've conquered the basics of transportation. They got you from here to there in a fun and efficient way. But there was one problem: Once you arrived "there," you usually weren't allowed inside unless you took the skates off. This meant lugging along shoes, changing, and then lugging around your skates. What was once exciting became exasperating.

This may be part of the reason sales of inline skates have dropped off. According to the National Sporting Goods Association, 1995 was the peak year, with 7.2 million units sold in the United States. That number declined to 6.4 million in 1996, the last full year for which statistics are available. And the industry anticipates that the final calculations will show even lower numbers for 1997.

A sample of Rossignol's line of skates shows off a more urban sense of style.

Soft boots and detachable wheels are regarded as the hope for the future. They evolved after K2 introduced the first soft-boot skate two years ago. Shortly afterward, Hypno and Rossignol combined the soft boot with detachable wheels. "For so long the focus was on the real tech stuff—specs about wheels, bearings and axles," says Nate Otis, Hypno's product manager. "That stuff gets boring after a while. We wanted to shift the focus to the boots."

Mission accomplished

The difference between hard and soft boots goes beyond convenience. A hard boot is more or less a plastic box with a foot pad in the bottom. The hard shell provides support, but it's heavy, hot and inflexible.

Soft skates have an internal frame made of plastic or fiberglass-reinforced nylon. It's the same concept used in ice hockey skates and cross-country ski boots. These internal supports provide as much lateral support as a hard skate, but they allow more shoelike construction.

Soft boots are made from fabrics such as leather and nylon, which are lighter, cooler and more flexible than hard plastic. Like shoes, soft boots are built on a last—which is a preformed pattern that matches the natural shape and curves of the foot. The last and the softer materials make the boots form-fitting.

Besides adding comfort, this snug fit also improves performance. The skate responds better to even the slightest movement of the foot. Otis

compares the difference in handling to the difference between driving a sedan and driving a sports car.

When you take the wheels off, the soft materials and the rubber outsole have enough elasticity to allow your foot to flex. It's not quite the same as wearing Birkenstocks, but you can make your way around without drawing too many stares. And in the future it'll be possible to own one set of wheels and several pairs of boots that you can snap on and off interchangeably—kind of a Mr. Potato Head of skates.

The "boring" stuff

Although each company lays claim to the feat, who came up with the product first is inconsequential. Suffice it to say, both products hit the U.S. market sometime in 1997. Of greater interest is how they work.

The interface that connects the shoe to the chassis is the same on both skates. In fact, they both utilize the same patent, which is owned by Hypno and licensed by Rossignol.

The heart of the device is the intersole, which is molded into the bottom of the boot. This hard piece of glass-filled nylon has three tabs—one toward the front, one in the middle and one at the heel. The front two slide under receptacles in the chassis and the back one is snugged down by a lever clamp. To remove the wheels, simply release the lever and slide the chassis forward.

Out on the street, the skates are indeed that easy to use. I can slide them on and off without even sitting down. They're noticeably lighter and less clunky than hard skates. While using either brand, my ankles feel secure and the wheels roll freely without wobble.

The performance is a result of the stiff undercarriage, integral connection points and wheel assembly. Most of these skates use top-of-the-line Hyper wheels and either ABEC 3 or ABEC 5 bearings with aluminum or nylon spacers. While these are not high-performance specs, they're fine for average to heavy recreational users.

The Hypno boots are definitely more streamlined and comfortable. In all fairness, though, I tested Rossignol's Traffic series skate, which is being phased out this spring for the company's new lighter and more streamlined Junction series. The price for the new Junctions will range from $179 to $259, while the Hypnos range from $199 to $279.

The other big difference is in styling. The Hypnos are a little more conservative—almost as if they're trying to hide among the shoes. To call the Rossignols "youthful" might imply I'm getting old, so let's just say they have attitude.

It moves me

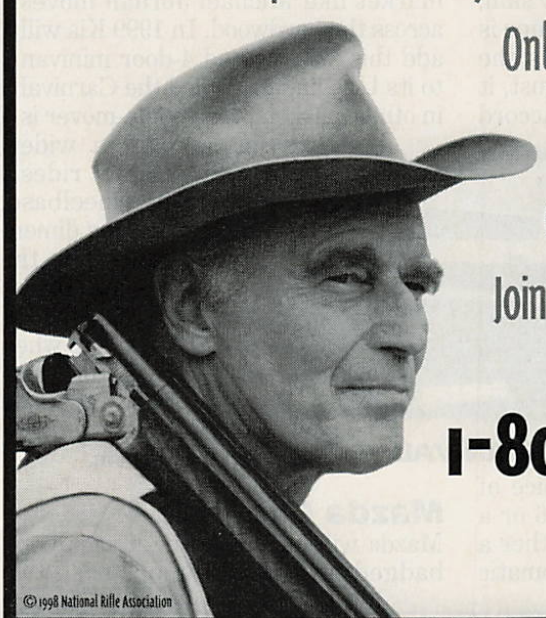
Detachable skates with soft boots—inline shoes—promise to bring the joy back to self-propelled transportation. After all, the appeal of inline shoes is freedom—you can run into a store, use the bathroom in a restaurant or grab a drink without hassles. And if you come across a hill you're afraid to skate down, you can just walk.

But don't be fooled about their shortcomings as shoes. "Most people ask me if they'll be comfortable if they walk around in the boots all day," says Otis. "I tell them if you're going to be walking all day, just wear shoes."

It's a good point. Although both companies are trying to improve the walking comfort of the boots, these are and always will be skates first. While two sets of wheels are a lot easier to carry than a pair of skates, you can't just stick them in a pocket either. And the boots are not exactly appropriate for the office.

If you want comfort, safety and unlimited access, walking is still the best bet. Just ask my cat. **PM**

There's a cultural war raging across America. Anti-gun media, politicians, educators and thought police are storming your values. Assaulting your freedoms. Killing your self-confidence. If you don't believe it, then **why don't you demand the Second Amendment be taught at your kid's school?** Fight back. Arm yourself with the courage of your convictions. Be proud of who you are and what you believe.



Only then and only together can we defy them and defend our way of life.

Join Me. Join Us. **Join Today.**

1-800-977-4NRA

ext. 942 EK Code 364796

© 1998 National Rifle Association

NRA ARMED WITH PRIDE

CONTRIBUTIONS, GIFTS OR MEMBERSHIP DUES MADE OR PAID TO THE NATIONAL RIFLE ASSOCIATION OF AMERICA ARE NOT REFUNDABLE OR TRANSFERABLE AND ARE NOT DEDUCTIBLE AS CHARITABLE CONTRIBUTIONS FOR FEDERAL INCOME TAX PURPOSES.

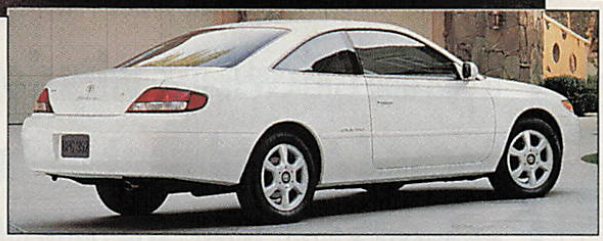
Asia Spy Report

BY SCOTT OLDHAM, West Coast Editor

TOYOTA SOLARA

1999 Toyota Solara

● If you don't remember the last Camry coupe, sold from 1993 to 1996, don't feel bad. You're far from alone. Its styling was so innocuous, even by Camry standards, that few people found it appealing enough to buy.



The 1999 Solara is proof that Toyota doesn't make the same mistake twice. Underneath that slick new skin, this front-wheel-drive midsize coupe is pure Camry. When its two models, the SE and SLE, hit dealers in August, it will compete with the Honda Accord coupe and the Chrysler Sebring.

With SE, buyers have a choice of either a 200-hp dohc 3.0-liter V6 or a 136-hp dohc Four, backed by either a 5-speed manual or 4-speed automatic transmission. Yes, you heard right. You'll be able to get the 5-speed with the V6. The Solara SLE will feature the V6 with the automatic only and a higher level of standard luxury features. Both models will be available with an optional rear spoiler and 16-in. wheels and tires.

Kia Minivan

Kia, the small but persistent Korean carmaker, is cutting through the U.S. market like Michael Jordan moves across the hardwood. In 1999 Kia will add this V6-powered 4-door minivan to its U.S. lineup. Called the Carnival in other markets, the people-mover is 193 in. long, 75 in. wide and 68 in. tall. It rides on a 115-in. wheelbase, which makes it a dimensional near-twin to the Toyota Sienna. Prices will be in the $15,000-to-$20,000 range when the Carnival—or whatever it's going to be called—debuts during the next football season.

KIA CARNIVAL

Mazda Cab Plus 4

Mazda will introduce the first import-badged pickup with more than two doors, due at dealers by May or June. The Cab Plus 4 features two additional suicide-type doors, much like the Quad Cab Dodge Ram truck. The Cab Plus 4 extras will be optional on B-Series trucks equipped with the SE trim level.

MAZDA CAB PLUS 4

Man-Eating Tiburon

Looking for a way to turn its Tiburon into a carnivore, Hyundai turned to HKS USA for performance parts and purple paint. On went an exhaust header feeding an extra-loud Drager sport exhaust, a Super Mega Flow intake system, an enlarged and polished throttle body, cross-drilled brake rotors and metallic brake pads. Then the Recaro racing seats, 17-in. 3-piece alloy wheels, 40-series Nitto tires and a watch-me-go-by rear spoiler were bolted on. Sadly, these goodies won't make production, but consider the car a crystal ball into the minds of Hyundai's product planners. What will make production, however, are an all-new Sonata in the fall, followed by a new Accent in the fall of '99 as a 2000 model and, finally, in 2000 or 2001, a CR-V- or RAV4-size sport/utility.

HYUNDAI TIBURON

Not The New Pathfinder

Nissan will introduce a new SUV based on its Frontier pickup. The new truck will not replace the Pathfinder—it will be sold alongside it. When describing the U.S.-market-exclusive truck, Nissan officials point to the Mitsubishi Montero Sport. They say this new sport/utility will be a real off-road 4x4, with strong, powerful styling and a lower price than the Pathfinder. Built in Smyrna, Tennessee, the truck will offer optional V6 power. PM

LES BIDRAWN PHOTO (HYUNDAI TIBURON)

SUZUKI®

SAVAGE® 650

INTRUDER® 800

MARAUDER™ 800

INTRUDER® 1400

CRUISERS ARE ON YOUR LEFT.

ACCESSORIES ARE ON YOUR RIGHT.

THE OFFER IS STRAIGHT AHEAD OF YOU.

This is one time you shouldn't be laid back. Rush to a participating Suzuki dealer during SuzukiFest '98 and get your choice of $500 worth of accessories free, on select models. Then grab great financing deals like $0 down, low APR or low monthly payments on a variety of motorcycles. But hurry. You know the phrase, "Don't know what you have 'til it's gone?" SuzukiFest '98 is gone March 31st.

Now during SuzukiFest '98 you can get

$500

WORTH OF ACCESSORIES FREE

when you buy a selected Suzuki motorcycle.

SUZUKI FEST 98

CALL 1-800-828-RIDE OR VISIT US ON THE WEB AT WWW.SUZUKI.COM FOR MORE INFORMATION. See participating dealers for details. Restrictions apply. Accessory items shown are for illustrative purposes only and may exceed $500. Finance offers with approved credit. At Suzuki, we want every ride to be safe and enjoyable. So always wear a helmet, eye protection and protective clothing. Never ride under the influence of alcohol or other drugs. Study your owner's manual and always inspect your Suzuki before riding. Take a riding skills course. For the course nearest you, call the Motorcycle Safety Foundation at 1-800-446-9227. COUPON NOT NECESSARY FOR REDEMPTION. OFFERS END 3.31.98.

SCIENCE

The Chemistry Of Violence

BY JIM WILSON, Science/Technology Editor

● Understanding why Vincent Van Gogh cut off his ear may provide an important new clue in explaining violent crime. Two scientists say they have strong evidence that violent rages can be sparked by the accumulation of harmful metals in the brain. Some believe the outburst that led Van Gogh to take a razor to his ear may have been triggered by metals in his paints. It is no coincidence, says one scientist, that counties with high rates of violent crime are also those at most risk from metal contamination.

An early clue to a link between metals and violence came from autopsies. When criminals die while committing violent crimes their bodies are tested for alcohol and drugs. In some cases scalp hair is analyzed as well. This slow-growing hair acts as a sort of log of the chemicals to which an individual has been exposed. It was with this thought in mind that medical examiners ordered an analysis of hair samples from mass murderer James Oliver Huberty, who in 1984 was shot to death by police after killing 21 people in a San Ysidro, California, restaurant.

What they found in Huberty's hair was startling. "He had the highest cadmium level we had ever seen in a human being," recalls William J. Walsh, the president of the Pfeiffer Treatment Center of Naperville, Illinois, and an expert on the link between metal poisoning and violence. "I remember getting a call from the assistant medical examiner who was working on the case. 'I have one question for you,' he said. 'If Huberty had this much cadmium in his body, why wasn't he dead?'"

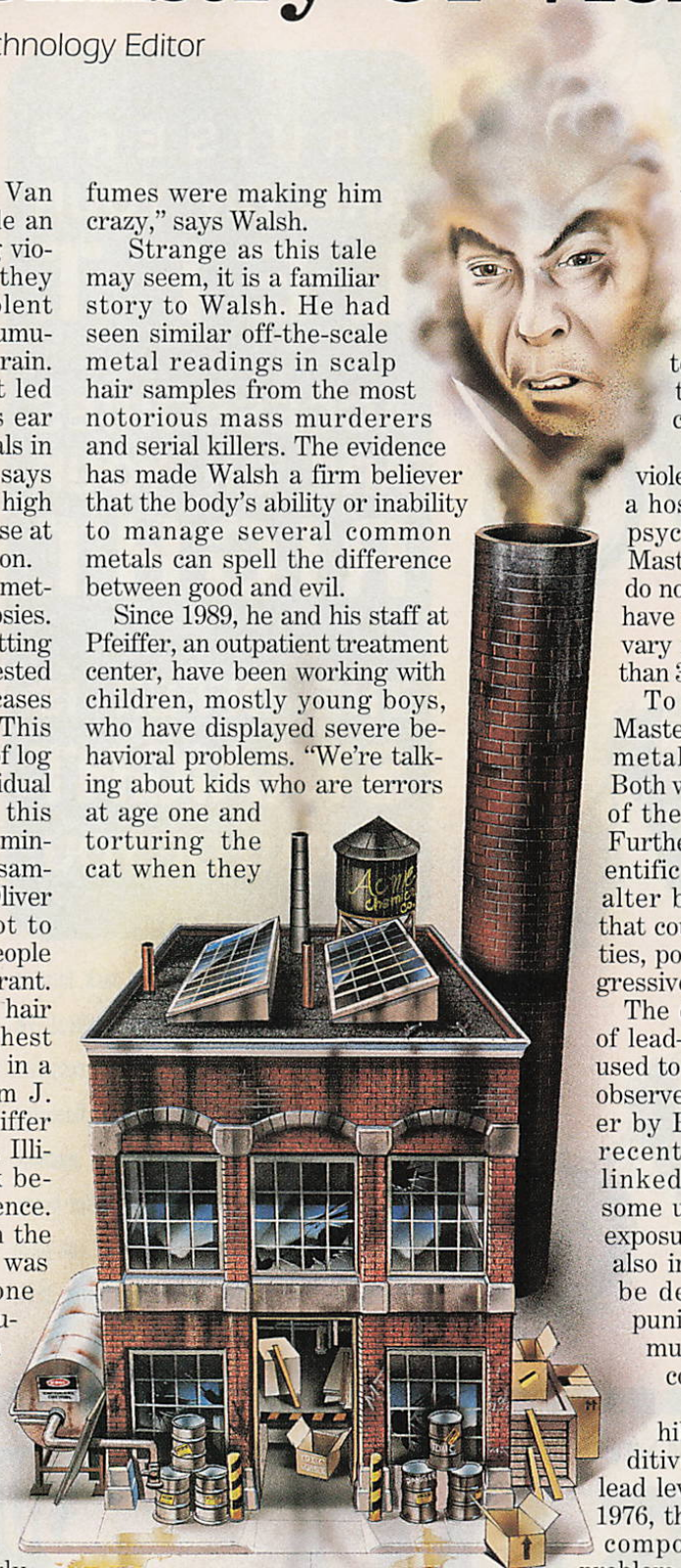
Suspect metals

Cadmium kills by destroying the kidneys. As investigators looked more deeply into Huberty's background, they discovered that indeed the metal had nearly killed him, twice. On each occasion, emergency room teams had coaxed his failing kidneys back from the brink, Walsh reports.

There was no mystery about the source of the cadmium. Before coming to California, Huberty had worked as a welder. "During an exit interview his employer asked him why he was leaving. He said that the fumes were making him crazy," says Walsh.

Strange as this tale may seem, it is a familiar story to Walsh. He had seen similar off-the-scale metal readings in scalp hair samples from the most notorious mass murderers and serial killers. The evidence has made Walsh a firm believer that the body's ability or inability to manage several common metals can spell the difference between good and evil.

Since 1989, he and his staff at Pfeiffer, an outpatient treatment center, have been working with children, mostly young boys, who have displayed severe behavioral problems. "We're talking about kids who are terrors at age one and torturing the cat when they are two," he says. Chiefly by adjusting the children's diets, he says, the center has been able to prevent troubled children from becoming ruined adults.



Walsh is not the only one to draw a line between certain metals and behavioral problems. Roger D. Masters, a professor of government at Dartmouth College, is also intrigued by the connection. Like Walsh, Masters does volunteer work with prisoners. But while Walsh—a chemical engineer by training—looks inward at the imbalances of metals in individuals, Masters looks outward, toward the effects of metals on communities.

"Prevailing theories of violent crime properly implicate a host of social, economic and psychological variables," says Masters. But these factors alone do not explain why U.S. counties have rates of violent crime that vary from less than 100 to more than 3000 per 100,000 people.

To explain this variability, Masters decided to focus on two metals: lead and manganese. Both were plentiful in some parts of the country but not others. Furthermore, there was solid scientific evidence that both could alter brain chemistry in a way that could cause learning disabilities, poor impulse control and aggressiveness, he says.

The deleterious mental effects of lead—which was once actually used to sweeten bad wines—were observed by Hippocrates and later by Benjamin Franklin. More recent research has strongly linked lead with lower IQs in some urban children. Prolonged exposure to low levels of lead can also impair a person's ability to be deterred by the threat of punishment, says Masters. So much for long sentences discouraging criminals.

Although legislation prohibiting lead in gasoline additives and paint has reduced lead levels in blood by 78% since 1976, the release of lead and lead compounds remains a serious problem, says Masters, due mostly to aging water systems and pollution from factories and mines.

Manganese might not be as well-known as lead, but it too has been associated with behavioral disturbances, including loss of impulse control and outbursts of violent behavior under stress. Like lead, it is pervasive. "Early in this century, cast iron was the most typical material for pipes and

PM ILLUSTRATION BY PAUL DIMARE

conduits. No. 20 gray cast iron normally contains .4% to .6% manganese," Masters explains. "Aging or rusting pipes could therefore leach toxins like lead and manganese into water supplies, particularly in the decaying inner cities now inhabited by the poor."

Reverse Prozac

Neuroscientists believe that manganese inflicts its damage by lowering the amount of serotonin in the brain. Serotonin belongs to a class of chemicals called neurotransmitters. Their function is to carry signals between the gaps that separate individual brain cells.

"Low levels of serotonin in the brain are associated with mood disturbances, poor impulse control and increases in aggressive behavior," says Masters. He points out that these problems have been treated with Prozac, a drug that helps the brain make better use of available serotonin, and other pharmaceuticals.

Vitamin and mineral deficiencies—an especially serious problem among the poor—also play an important role in increasing lead and manganese uptake. "The combination of calcium insufficiency and manganese toxicity could therefore be described as reverse Prozac," Masters says.

With two likely metallic suspects in mind, Masters pored over the U.S. Environmental Protection Agency's Toxic Release Inventory. Breaking this information down county by county, he factored in crime report data from the Federal Bureau of Investigation, alcoholism statistics from the Department of Health and Human Services and socioeconomic and demographic data from the Census Bureau.

When this massive number-crunching job was done, the findings were startling. "In counties with no reported releases of lead or manganese and below-average deaths from alcoholism, rates of violent crime are below average. That is, 216 [crimes] per 100,000 [people] compared to the national mean of 298," Masters says.

By contrast, there were 920 violent crimes per 100,000 people in the 52 counties where toxic releases from both metals were present and where there were also above-average rates of alcoholism. Alcohol might seem to be the culprit. Masters acknowledges that it is important—its ability to reduce inhibitions are, after all, legendary—but the difference in crime could not be attributed to spirits alone. Even in counties with a below-average number of alcohol-related deaths, the violent crime rate was about twice as high when lead and manganese were present. It wasn't a statistical fluke. There truly was a pollution-violence link.

Changes ahead

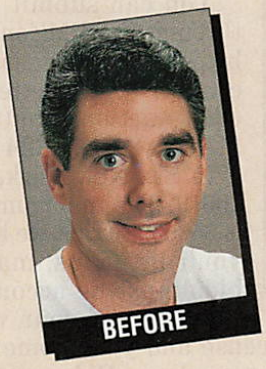
Masters says his research suggests that traditional approaches to deterring violence need to be reconsidered. The effect of metals and other compounds that damage nerve function may be especially important in explaining why rates of crime have differed so widely by geographical region and by ethnic group, he says. "Our analysis shows that neurotoxic metals significantly contribute to rates of violent crime.

"It's the breakdown of the [brain's] inhibition mechanism that's the key to violent behavior," says Masters. "The presence of pollution is as big a factor [in predicting crime] as poverty."

Some of those who have been following Masters' work—which will be published later this year—believe his findings should become the rallying point for an entirely new approach to violence and crime control.

"Perhaps," suggests Michael Zimmerman, a biologist who is also dean of the University of Wisconsin College of Letters and Science, "conservatives who have long argued that it is time to get tough on crime will now join with environmentalists to get tough on industrial polluters." PM

"Nobody could tell that my gray hair was gone...thanks to Just For Men®."



James Novak
Construction Project Manager

"After I tried Just For Men®, I wondered what the guys at work would say. Nobody said anything because nobody could tell. They asked if I was working out or lost some weight. That's how natural it looks!"

Just For Men® 5-Minute Haircolor.

- Blends away gray hair in 5 minutes... without changing your natural color.
- Brings back the look of your own natural color. Lets you keep some gray, if you want.
- Conditions, too. Hair looks thicker, healthier.

Also available in Just For Men® 5-Minute Color Gel for Mustache, Beard & Sideburns.

Full range of shades available for all men. In the men's grooming section.

For Free Men's Grooming Guide Plus Coupons, call 1-800-431-2610; visit: www.justformen.com

Bid On PM's Project Olds

BY CLIFF GROMER, Contributing Editor

● If the women's magazines can have makeovers, why can't we? Well, now we do, starting with the March '98 issue of POPULAR MECHANICS. No, we didn't run an article on how to apply eye makeup, but we did transform an '84 Olds Cutlass Supreme from a run-down wreck into a very nice driver. The Cutlass was the first in a series. Keep in mind that these are not full restorations. Instead, we'll show you how to renew and freshen a variety of commonly available used vehicles to make them into solid, enjoyable daily drivers.

And now, as promised earlier this year, we're going to auction off the car through the PMZone to a lucky reader.

We happened upon this rustfree but well-worn 60,000-mile Olds in Fort Lauderdale, Florida. And yes, it was owned by a little old lady whose maintenance plan for her car was pure neglect. We don't think she even knew the meaning of the term "oil change." It was no surprise that the engine was junk. The suspension was not much better and the paint was faded and cracking, although the interior was in decent shape.

In fact, the Cutlass was an ideal makeover candidate. Literally millions of Olds Cutlasses (and other General Motors G-body family members: Chevy Monte Carlos, Buick Regals and Pontiac Grand Prix) can be found in garages, driveways, used car lots and salvage yards across America.

The operating premise for our makeovers is to keep the bucks low and make the best of what you've got or can afford. It's just like many of those fashion-magazine makeovers—where they take a colorless housewife, and with nothing more than clothes, mascara and a chic hairdo, turn her into a rival for Claudia Schiffer (well, almost).

One thing we happened to have lying around was a disassembled 454 Chevy V8 and a Turbo Hydra-Matic 400 automatic transmission. Since we had them on hand, we decided to use them, although we could have used any number of other powertrain combinations.

It was a blessing that we didn't have to purchase an engine and transmission. It was something of a curse that we used a big V8 engine. The point again is to use what you have or what you can buy inexpensively on a project like this. We could just as easily have used a small-block Chevy or one of GM's many V6 variants. Using the 454 mandated other mechanical changes, such as beefed up suspension and brake components, that might not have been needed had we chosen some other engine. Work progressed from back to front. We opted for a junkyard-supplied limited-slip rear axle from a Buick Grand National, equipped with 3.55:1 differential gears. This moderate gearing promised a perfect compromise between low-speed acceleration and high-speed cruising.

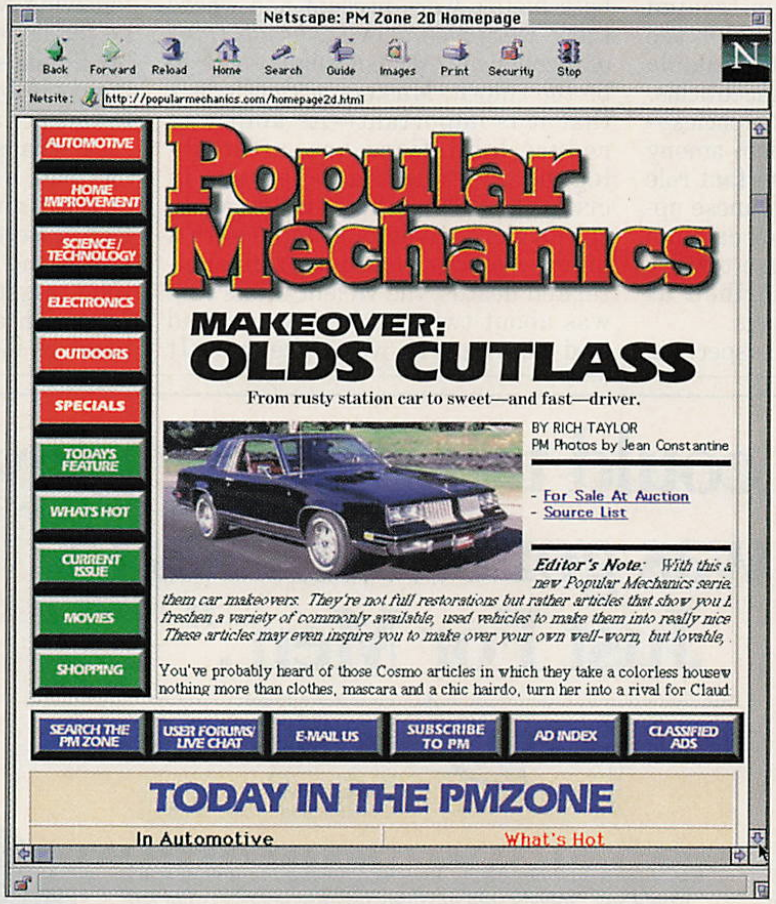
In the end, we had a car that is a delight to drive—if you like potent, high-performance machinery. And of course, we brought the Olds's appearance—inside, outside and under the hood—up to and even beyond snuff.

If our Olds Cutlass project car sounds like a vehicle you'd like to own, then we invite you to bid on it. Before deciding to bid, however, you should understand that this Oldsmobile Cutlass delivers an extremely high level of performance. The engine is loud, the suspension taut, fuel mileage is lousy and the transmission shifts hard. You might not be happy with it as a daily driver if you're looking for a soft, cushy commuter, or if you're not comfortable driving high-performance machinery. That said, the car is solid, well built and reliable.

The vehicle will be sold as is. No warranty or guarantee of any kind is expressed or implied. All taxes, license fees, insurance and other fees are the sole responsibility of the purchaser.

You can submit bids through the PMZone, at http://popularmechanics.com. Or send a letter to: Olds Auction, POPULAR MECHANICS, 224 W. 57th St., New York, NY 10019. The minimum bid is $5000. So that we know you're serious, mailed bids must be accompanied by a photocopy of your valid driver's license and your home and work phone numbers. Bids accepted through our Web site must be followed up by mail with a copy of your driver's license and phone numbers.

The final bidding will take place on Friday, June 19, 1998, at 2 pm. Before that date, you can follow the bidding on our Web site by clicking on What's Hot and then on Car Auction. We'll update the latest bids every day. Even if you're not a bidder, you'll want to be online to share in the excitement. Some lucky PM reader is going to drive off in our really neat project car. It could be you. PM



PM PHOTO BY JEAN CONSTANTINE

A flood isn't the worst thing that can happen to you.

Not being insured for one is.

A flood moves with frightening speed. In minutes, a flood can wash away everything you and your family have spent a lifetime building.

But often the worst isn't the flood. It's finding out, too late, that you're not covered for flood damage.

You're probably not covered.

The truth is, 90% of all natural disasters in this country involve floods. Yet, as many find out too late, most homeowner's insurance policies don't cover flood damage.

Everyone runs the risk of being a flood victim. In fact, between 25% and 30% of flood insurance claims come from "low risk" areas. It could happen to you.

Give yourself peace of mind.

Fortunately, now you can protect your home and property with flood insurance from the National Flood Insurance Program.

Return the coupon or call your insurance company, agent or this toll-free number: 1-888-CALL FLOOD, extension 468. Act now, since it takes 30 days before your coverage begins. Because with floods, you can never say never.

1-888-CALL FLOOD ext. **468**

Please send me information about NFIP.

MAIL TO: FEMA/CTI, PO BOX 1395, JESSUP, MD 20797-9408

Do you have an insurance agent or company? Yes ❑ No ❑

If yes, who is your insurance agent and/or company?

_____

Mag. Issue Date_____

Your Name_____

Address_____

City_____

State_____ Zip _____ Tel.(____)_____

National Flood Insurance Program
NFIP
Administered by FEMA

We can't replace your memories, but we can help you build new ones.

National Flood Insurance Program
NFIP
Administered by FEMA

NFIP, 500 C Street SW, Washington, D.C. 20472 ❧ TDD #1-800-427-5593 ❧ http: //www.fema.gov/nfip

Think It's New? Think Again!

The dirty truth about vacuums.

BY MARY SEELHORST

PRESENT • Small, handheld vacuum cleaners are clearing a path into the American consciousness. Always on the lookout for a new angle, manufacturers promote the ease and convenience of these little lightweight dust-eaters. Who wants to attach a cumbersome hose and lug a big motor around like a bulldog on a leash when you can just pick up and go with a miniature version of the old upright?

Marketing special-purpose vacuums has been so successful that many people own more than one. I have three—an electric broom, a wet-dry, and a little cordless rechargeable—and there's only one carpet in the entire house! Now that we have mini-vacs, upholstery, draperies and car interiors have never been so clean. Or have they?

PAST So you think little vacuum cleaners are new? Think again!

Most of us know that electric vacuum cleaners have been around for many decades. But until I saw this item in POPULAR MECHANICS, I was unaware that mini-size vacuums had been around so long.

PM featured a little vacuum cleaner as early as 1923, so small and light that it could be carried on a convenient shoulder strap for all those hard-to-reach areas, including your car upholstery, telephone switchboard equipment, motors and radiators. Weighing in at 6 pounds, it was comparable to today's 5.5-pound Dirt Devil Ultra Hand Vac.

Portable vacuum cleaners were a novel idea in 1923. But then "portable" is a relative term. Just like the first portable radios or computers, which were the size of suitcases, early portable vacuum cleaners were much larger than you might imagine.

The first motor-driven suction carpet sweepers in the United States were installed around the turn of the century. Now known as central vacuums, they were large plants permanently installed in the basements of big buildings, with ducts and hose fixtures built into the walls. But their size and cost meant that they were rarely installed in private homes.

Many innovators tinkered with the basic concepts of suction carpet cleaning in the century's first two decades. But it was an Ohioan named Murray Spangler who in 1908 came up with the basic upright configuration still used today. He sold one of his portable sweepers to a cousin. She loved it so much that her husband, who was in the leather business, bought the rights to manufacture the contraption. Good thing, too—because Mr. Hoover had already followed the leather market from horse harnesses to leather automobile parts, and cars were about to shed their luggage tie-downs and roof straps.

But the sweeping saga of the vacuum cleaner was just beginning. In 1909, only about 10% of American homes were wired for electricity. And homemakers did not want to be told that despite laborious beating, sweeping and blowing, their carpets were still full of dirt.

After a World War I hiatus, salesmen dusted off their sample cases and hit the streets. More homes were being wired every day, and every one housed a potential customer. Manufacturers looked for novel ideas to persuade buyers. Small, handheld vacuums were offered by at least a few manufacturers. Many offered accessories. Massage vibrators and hair dryers were favorites, including the little vac featured in PM, which was also handy for drying hair after a shampoo.

True, vacuum-cleaner/hair-dryer combos have been relegated to the dustbin of history—hair today, gone tomorrow. But at least we have uncovered a story that had been swept under the carpet. And if you don't like the corny puns in this article, don't blame me. The Dirt Devil made me do it. **PM**

OCTOBER 1923

SIX-POUND VACUUM CLEANER STRAPPED TO SHOULDER

So small that it is supported from the shoulder by straps, a vacuum cleaner, that weighs only 6 pounds, can be carried about without any discomfort, yet performs as many tasks as a larger instrument. For removing dirt and dust from crevices, where heavier tools cannot be manipulated, blower and suction attachments are provided, making it possible to clean inaccessible corners, telephone-switchboard equipment, motors, and radiators. It is also handy for drying hair after a shampoo.

Renovating Upholstering of an Automobile with Vacuum Cleaner That Straps to Shoulder

Checks Designed Just For You!

the Styles Check Company

FREE vinyl check cover
FREE check register
FREE deposit slips

- Express Your Interest
- Exciting Colorful Graphics
- Not Available Through Banks
- Checks Meet All Bank Regulations
- Satisfaction Guaranteed!

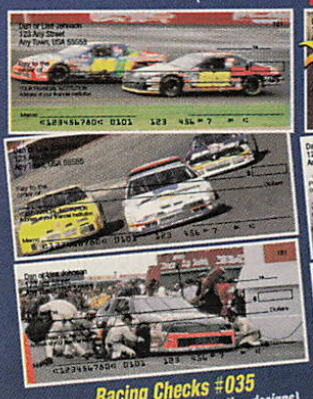
http://www.styleschecks.com

OPTIONAL PERSONAL EXPRESSION LINE of your choice here! (See details on order form)

Fighter Jet Checks #092 (3 rotating designs)

Also available from the Styles Company... Angels #052, ATV #063, Baseball #069, Basketball #014, Birds of Paradise #064, Boat Racing #038, Bowling #003, Cats #027, Country #009, Dental #56, Dolls #022, EMS #034, Environmental #010, Equestrian #078, Fantasyland #067, Fishing #023, Firefighter #032, Fitness #058, Football #075, Golf #061, Handyman #090, Hockey #076, Hunting #011, Indy Car #033, Inspirations #073, Joe Montana #030, Manicurist #017, Martial Arts #059, Mountain Bike #062, Medical #004, Music #055, Nautical #031, Nursing #020, Open Wheel #037, Pro Photography #076, Police #008, Puppy Luv #087, Real Estate #081, Reptiles #028, Retro #074, Rock Climbing #060, Running #094, Salon Toons #066, Scuba #051, Sewing #008, Snow Skiing #011, Indy Car #033, Inspirations #073, Joe Montana #030, Manicurist #017, Martial Arts #059, Mountain Bike #062, Medical #004, Music #055, Nautical #031, Nursing #020, Open Wheel #037, Pro Photography #076, Police #008, Puppy Luv #087, Real Estate #081, Reptiles #028, Retro #074, Rock Climbing #060, Running #094, Salon Toons #066, Scuba #051, Sewing #008, Snow Skiing #089, Soccer #079, Southwest #021, Sport Truck #065, Sport Fishing #088, Stylist #015, Top Fuel #036, Tennis #002, Tropical Fish #026, Teacher #005, Truckin' #057, Victorian #007, Volleyball #080, Watercraft #049, Waterski #083, Wedding #065, Wine #071, Army #040, Navy #041, Air Force #042 & Marine #043 Checks! CALL FOR A FREE BROCHURE! 1-800-356-0353

Hot Rod Checks #084 (3 rotating designs)



Racing Checks #035 (3 rotating designs)

New Drag Racing Checks #120 (4 rotating designs)

Mustang Checks #044 (3 rotating designs)

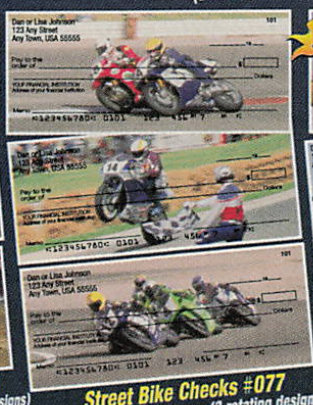
Mopar Checks #068 (3 rotating designs)

Corvette Checks #018 (3 rotating designs)

Muscle Car Checks #012 (3 rotating designs)

New 4x4 Checks #124 (4 rotating designs)

MX-Dirt Bike Checks #047 (3 rotating designs)



Street Bike Checks #077 (3 rotating designs)

Train Checks #082 (3 rotating designs)

Astronomy Checks #054 (3 rotating designs)

Snowmobile Checks #091 (3 rotating designs)

Pro Rodeo Checks #093 (3 rotating designs)

Alien Encounter Checks #053 (3 rotating designs)

Player Checks #045 (3 rotating designs)

Undersea Fantasy Checks #050 (3 rotating designs)

Also Available... Labels & Cover

Now all of our exciting graphics are available in full-size peel n' stick address labels!

Shown matches Fighter Jet #092
Actual size: 2¼" x 1¼"

To order matching address labels...
PRINT CLEARLY on a separate sheet of paper what you would like printed on your address labels (limit: 2 lines; see sample on ad). Please indicate quantity & alternate typestyle (if desired) to the right. $7.95 for the first set of 144 labels ORDER ADDITIONAL SETS AND SAVE... additional sets of 144 labels only $5.95! TOP LINE: limited to 30 characters. BOTTOM LINE: limited to 50 characters.

Labels have 3 rotating designs!

It's Easy to order checks...

1. Enclose an **original VOIDED check** or reorder form from your check supply. Indicate any changes **clearly on voided check or reorder form.**
2. Enclose a **sample deposit slip** from your existing checks.
3. Your daytime phone (_____)

* Number my checks starting with # _____
If start # is not specified, checks will start at #101

Select check style

Your order will be mailed to the address on your voided check. Allow 2-4 weeks for delivery	If optional typestyle is not added, checks will be printed with "standard blocktype"	(C) Old English add $2.50 (D) Script add $2.50 (E) Elegance add $2.50 (F) Architext add $2.50

See pricing and ordering instructions and enter amount here

Optional Personal Expression Line (max of 26 characters)--See example of Personal Expression Line on featured checks) _____ add $2.50

Matching Color Address Labels (See pricing & ordering instructions)

Matching check style # ZSL _____ Qty: _____ First set add $7.95 ea. Add'l sets add $5.95 ea.

If alternate typestyle is desired, check box (see examples above) (C) ☐ (D) ☐ (E) ☐ (F) ☐ add $2.50

Matching Leather Checkbook Cover, add $18.95 Style # ZCV _____ Qty & color: Black(B) ☐ Burgundy (R) ☐

Send check or M/O to:
THE STYLES COMPANY
P.O. BOX 5000
LAKE FOREST, CA 92630-8500

For questions concerning your order....1-800-356-0353

We also accept VISA & MasterCard.....

Card # _____ Exp ___/___

Optional matching leather embroidered check book cover.

(Shown is Fighter Jet #092)

• Check pricing & quantity •

Single Checks:	Duplicate Checks:
☐ 200 - $13.95	☐ 150 - $15.95
☐ 400 - $25.95	☐ 300 - $28.95
☐ 800 - $42.95	☐ 600 - $49.95

California add 7.75% sales tax

Priority mail service (can save up to 1½ weeks) add $3.95

Priority mail service and in-plant rush (can save up to 2 weeks) add $6.50

Up to $20.00 add $1.75, $20.01 to $30.00 add $2.75, $30.01 to $40.00 add $3.75, $40.01 & over add $4.75

Shipping must be added to receive your order

Z03261

TOTAL ENCLOSED

Cable Of The Future

BY TOBEY GRUMET, Electronics Editor

● TVs are getting wider, clearer and smarter. And broadcasters, whose regular fare is all analog, are finally beginning to talk about programming for these new TVs, whether it's digital multicasting or high definition.

So there's some good news and there's some bad news. The good news is, things are changing. Higher-quality pictures are becoming a reality for you as a consumer and more channels will be available, hopefully bringing out some new, improved shows. The bad news? Today, most consumers can't afford the TV of tomorrow.

NEXTLEVEL DCT-1000

Now add cable and satellite to this quandary. Satellite subscribers need not worry. Satellite is already digital—and therefore it's future-proof. And DirecTV even went the extra mile by showing the first high-definition broadcast through satellite this past January at the Winter Consumer Electronics Show in Las Vegas (read our report on page 58).

According to the National Cable Television Association, there are more than 65 million cable subscribers in the United States today. And guess what? Cable has always been an analog service. So in order to become part of this new digital future, digital cable set-top boxes are being installed right now by national cable companies such as TCI, Cablevision, Time Warner, Cox and Comcast.

GI/NextLevel manufactures the DCT-1000 digital cable set-top box, the superbox some of these cable stations are now using. But it's not just the ability to receive digital programming when it becomes available that has led cable companies to offer this new set-top box.

Computer companies are poised to become big players in the entertainment side of your life. In response, cable companies are finding it imperative to offer more than just channel surfing. In the future, cable companies are hoping to bring you Internet access, e-mail options and interactive programming. For now, NextLevel allows cable companies to offer digital cable services that could, depending on your analog system, add up to 36 additional channels of video and 10 digital audio channels to your current services, as well as an interactive program guide by Prevue.

In the box

If you decide to try NextLevel's DCT-1000 box, it's included in the cable equipment leasing fee, which varies based upon local regulations and cable rates. "We're continuing the rollout of these services," says LaRay Marsik, spokesperson for TCI. "It's a community-by-community availability and an aggressive rollout," and it continued throughout this winter.

The box uses MPEG2-based digital compression, which allows a compression rate of up to 12:1. If the system being addressed has open analog channels, additional digital transponders can be added to dramatically enhance the analog channel capacity currently available. This allows additional digital video channels to be added. "But it's a delicate balance to strike. The analog customers certainly don't want to sacrifice their analog channels so digital customers can have more," adds Marsik.

Digital compression is accomplished through an algorithm that converts an analog TV signal to digital. Basically, compression is the deletion of information that's superfluous to the creation of a picture on your TV. You don't need all the information provided to tell you that the sky is blue. Fill the space of the information that was taken out with other, digital, information and that's digital compression. So, for instance, if a cable company has 10:1 compression working, that's 10 digital channels in the space of one analog channel. Fifty channels can now turn into 500 channels.

When a system is upgraded from analog to digital, you need a set-top box to receive the digital signal and make it receivable by an analog TV. That upgrade needs to take place at the cable company's head-end. NextLevel supplies that transmission equipment as well.

In October 1996, the first digital cable system was launched in Hartford, Connecticut, with NextLevel's technology. It was an end-to-end solution, with the signal going straight to the cable system's head-end. From there, it was transmitted down coaxial cable to homes in digital format, where a set-top box converted it to an analog signal on customers' TVs.

Digital dollars

Cable companies have always been wary of providing digital service because of the costs involved. Replacing an entire cable infrastructure costs loads of money. But a low-cost shortcut is possible: Upgrade the cable head-ends—which are simply the local offices which receive programming signals—and decompress them. It's not as thorough, but it's certainly less expensive.

TCI claims that it will be doing both. According to Marsik, the company has already begun to rebuild and upgrade its infrastructure in order to expand analog space. This will also open the door for the future of two-way data communications, which will allow you to become more interactive. **PM**

TRISTAR PICTURES PHOTO (TOP)

Smooth,

satisfying taste

at ultra-low tar?

Here it is!

You got it!

You've got
MERIT
ULTRA LIGHTS

© Philip Morris Inc. 1998

5 mg "tar," 0.5 mg nicotine av. per cigarette by FTC method.

SURGEON GENERAL'S WARNING: Smoking By Pregnant Women May Result in Fetal Injury, Premature Birth, And Low Birth Weight.

New Cars

BMW M3 Convertible And M Roadster

● BMW offers two new M model cars for the 1998 model year, one based on the 3 Series convertible and called the M3 convertible, the other based on the Z3 roadster and called the M roadster.

Special features of the M3 convertible include the high-performance powertrain. The engine is a 24-valve dohc 3.2-liter inline Six that delivers 240 hp. It's mated to either a manual or automatic 5-speed. In typical M design practice, a number of chassis upgrades add strength. Body height was lowered by 0.3 in. and shocks, springs and stabilizer bars were tuned for a more controlled ride.

The M roadster shares the convertible's 240-hp 3.2-liter Six. In the roadster, however, only the manual is available. Chassis tweaks give the M pavement-hugging ability not found in any other Z3. Among the changes are a lower ride height, firmer shock absorber settings, larger brakes and a fine-tuning of front and rear springs. You'll find no spare tire on this M model. In its place is a container of sealing material and a microcompressor that runs off the car's electrical outlet.

Up front, the fascia is designed for better air intake and a unique appearance. At the rear, four exhaust outlets set the M apart from lesser Z3s.

—Jim Dunne

Lexus RX 300 And LX 470

Shaped and sized to go grille to grille with the Mercedes-Benz ML320, the RX 300 is arriving at dealers right now. RX 300 is available with front-wheel drive only or all-wheel drive with no Low range. We found the 2wd model to suffer from an overly soft suspension and a fair amount of torque steer. The awd is better.

Built on a unibody, with front and rear subframes that isolate the body from the MacPherson-strut suspension, the RX 300 is powered by a 24-valve 3.0-liter V6 with VVT-i, Lexus's variable valve timing. Output is 220 hp and 222 ft.-lb. of torque, with 80% of that torque available at 1600 rpm. Features include front side airbags, a drawer-type console with four cup holders, an optional in-dash 6-CD changer and rear seats that recline and slide forward 4.7 in. This all adds up to a very carlike SUV, one that's smooth, quiet and luxurious.

Last month we praised the new '98 Toyota Land Cruiser for its new-found class-leading ride, refinement, power and off-road capability. Now take that truck, add softer leather, a standard in-dash, single-feed 6-CD changer, heated and power-folding outside mirrors, heated front seats, rear a/c, an outside-temperature gauge, and Automatic Height Control (AHC) and Adaptive Variable Suspension (AVS), and you've got the '98 Lexus LX 470.

NISSAN 200SX SE-R

With the vehicle's 230-hp 4.7-liter V8, assorted technology and its other impressive Land Cruiser stock, the LX 470 is certainly the new king of the prestige luxury SUV mountain.

—Scott Oldham

Nissan 200SX SE-R And Sentra SE

Two cars, one engine, one price—well, sort of. For '98, Nissan's revised 200SX SE-R and the newly introduced SE version of the Sentra carry the same suggested price: $16,749. Both are powered by a 140-hp dohc 2.0-liter Four. And for that price, both come equipped with a 5-speed manual. Opting for a 4-speed automatic increases the price of each to $17,549.

—Don Chaikin

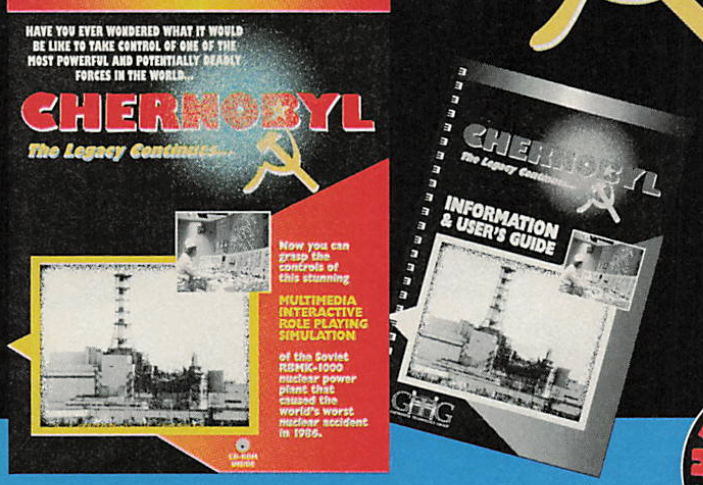
PM PHOTOS BY SCOTT DAHLQUIST (BMW)

Tasmanian Devil 1998™ & ©1998 Warner Brothers. Chevrolet, the Chevrolet Emblem, Monte Carlo and Z34 are registered trademarks of the GM Corp. ©1998 GM Corp. Buckle up, America! www.chevrolet.com or 1-800-950-2438.

Ever wondered what it would feel like to take control of one of the most powerful and potentially deadly forces in the world?

CHERNOBYL

The Legacy Continues...


HAVE YOU EVER WONDERED WHAT IT WOULD BE LIKE TO TAKE CONTROL OF ONE OF THE MOST POWERFUL AND POTENTIALLY DEADLY FORCES IN THE WORLD...
CHERNOBYL
The Legacy Continues...
Now you can grasp the controls of this stunning
MULTIMEDIA INTERACTIVE ROLE PLAYING SIMULATION
of the Soviet RBMK-1000 nuclear power plant that caused the world's worst nuclear accident in 1986.
INFORMATION & USER'S GUIDE

This is as close to the real thing as you can get.

With shocking realism you can operate a nearly identical replica of the infamous Chernobyl unit 4, RBMK-1000 nuclear power reactor and turbine generator. This is the reactor that, in 1986, dumped over 200 times the radiation into the atmosphere as the atomic bomb dropped on Hiroshima in 1945. The disaster was caused by gross mis-operation, but this reactor and 15 other similar plants were designed to fail.

Its realism has stunned nuclear professionals.

This product is a must for Students, Engineers, or anyone that has a taste for raw mechanical devices, science, or nuclear energy. Experience the power. Experience the anxiety. This is the ultimate cerebral challenge.

This is it.

Over 600 Megabytes of comprehensive multi-media instruction and on-line help movies are included.

Oh yes... You have to maintain the budget. Since the accident and the fall of the former Soviet Union, rubles are sometimes too scarce to even pay the operators. How would you keep a trouble prone nuclear plant operating with virtually no budget? Like them, I guess you will have to figure that out.

CHERNOBYL, THE LEGACY CONTINUES requires a 4X or faster CD-ROM, 12 Mb of Ram, (16 Mb preferred) Microsoft Windows 3.1 (95 preferred), 100 Mhz 80486 (Pentium preferred), Sound Blaster or compatible sound card, 800 x 600 or higher resolution with 32,000 colors. (640 x 480 resolution 256 colors will work, but the multimedia help files will display poorly). This program uses over 80 Microsoft AVI movies. A multimedia PC is a must.

CHERNOBYL, THE LEGACY CONTINUES, can be purchased for $69.95 using your Visa, Master Card, or American Express. Sorry, no CODs. Add $7.00 shipping and handling for dependable FedEx overnight service.

Order toll free anytime by calling **1-800-356-1058**
or purchase using our secure commerce (credit card safe) web site.
Our address on the internet is: **www.gatekeepsw.com**

GATEKEEPER TECHNOLOGY GROUP

SUPERIOR MULTIMEDIA SIMULATION PRODUCTS

Popular Mechanics
APRIL 1998

UP CLOSE AND PERSONAL

Binoculars are increasingly complex. Buying them doesn't have to be.

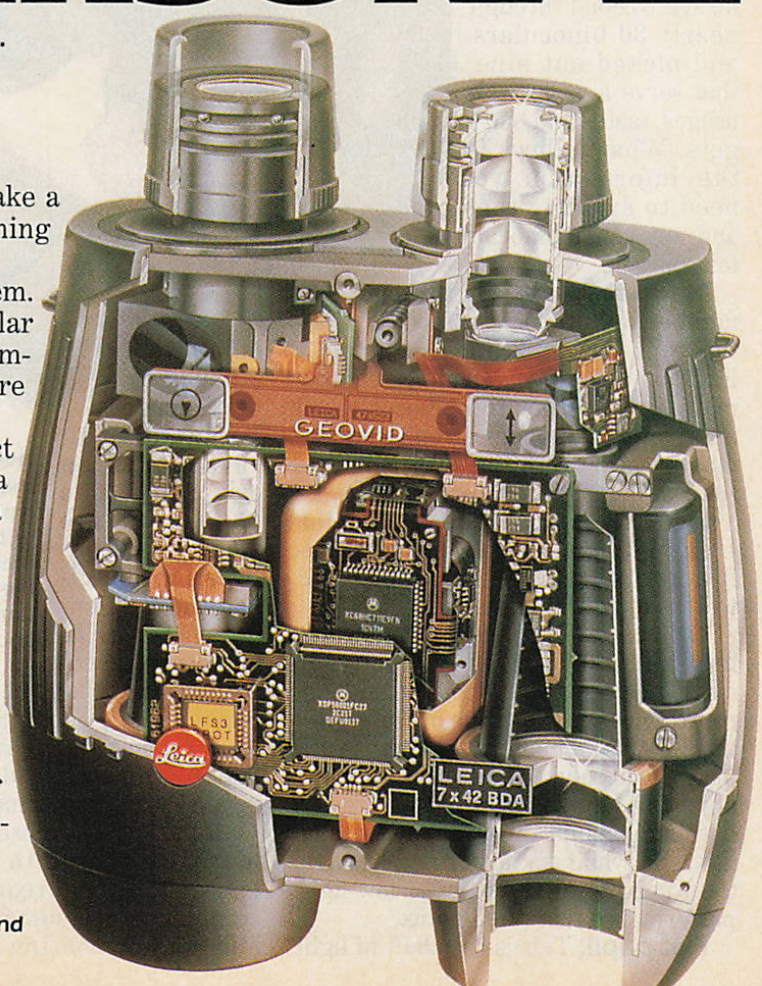
BY JIM GORANT, Outdoors Editor

● Let's start at the beginning. A pair of oculars make a binocular. Unless you're talking about two matching sets, there's no such thing as a pair of binoculars.

Congratulations. Now you know what to call them. Unfortunately, that doesn't make buying a binocular any easier. These dazzling little eye amplifiers are complex pieces of equipment and they keep getting more so every day.

The new Leica Geovid BDA 7x42 is the perfect example. It has a built-in infrared rangefinder with a 1000-meter range. That's almost three-quarters of a mile and more than twice the range of any other binocular-rangefinder on the market. It's fast (reads out in about 3 seconds), accurate (to within 1 meter) and easy to use (push a button). It also has an electronic compass that's just as handy. Its all-aluminum body is encased in rubber armor that protects its delicate microelectronics and helps render the glasses spray-resistant.

But while the Geovid is a spectacular bit of mechanical innovation, it shows how the most technologically advanced binocular may not be the best one for you. The gadgetry plus the casing drive its weight up



The inner workings of the Leica Geovid BDA 7x42 include complex circuitry and advanced microelectronics.

PM PHOTOS BY BRIAN KOSOFF

UP CLOSE AND PERSONAL

SPECIFICATIONS

Prices listed are manufacturer's suggested retail prices. Most binoculars sell for 10% to 15% under suggested price.

MODEL	LEICA GEOVID BDA 7x42	STEINER COMMANDER 7x50	ZEISS NIGHT OWL 7x45	STEINER MINI SCOPE 8x22
Prism Type	Porro	Porro	Roof	Porro
Prism Material	BaK-4	BaK-4	SF59	BaK-4
Focus	Individual	Diopter	Diopter	Auto
Waterproofness	Salt Water Splashproof	Submersible	Waterproof/Fogproof	Rainproof
Field Of View	394 ft.	385 ft.	495 ft.	336 ft.
Exit Pupil	6mm	7.1mm	6.5mm	2.7mm
Eye Relief	19.3mm	22mm	17.7mm	11mm
Weight/Height/Width	3 lb. 4 oz./8.1 in./7 in.	40 oz./5.2 in./8.2 in.	2 lb. 9 oz./7.5 in./5.3 in.	3 oz./1.9 in./3 in.
Price	$3200	$2399	$1540	$199

to 3 pounds 4 ounces. For mostly stationary hunters, the extra weight might be a worthwhile tradeoff, but for hikers, forget it. Likewise, boaters with protected helms and dry storage will love the Geovid, but considering the $3200 price tag, those with an open deck should probably look elsewhere.

The secret to binocular buying is understanding what you need and then knowing how to find the instrument that meets your need. That's where we come in. We weeded through nearly 30 binoculars and picked out nine that serve a variety of usages, tastes and budgets. What follows is the information you need to evaluate these and any other binoculars for yourself.

Magnification: The first number on a binocular label is the level of magnification, as in the Fuginon CD 10x42. It indicates how many times larger the binocular will make objects appear. Don't confuse magnification with size. For instance, the Fuginon is 5.5 in. long and weighs 1 pound 12 ounces, while the Pentax UCF Mini 10x21 has the same magnification but is only 4.1 in. long and weighs only 7 ounces.

Objective lens: This is the larger lens that's farther away from your eye. The second number on the label represents the diameter of the objective lens in millimeters—42 in the case of the Fuginon. Generally, a larger objective lens offers a larger area of detailed resolution and lets in more light. So while it's larger and heavier, the Fuginon will offer better low-light performance than the Pentax.

Exit pupil: This is the shaft of light delivered to the eye. It's also measured in millimeters, and once again larger means more light. It appears as the bright circle at the center of the eyepiece when you hold the binocular out in front of you. It's determined by dividing the magnification into the objective lens. So the Simmons EuroDeluxe 10x30, with an exit pupil of 3mm (30/10), will fall somewhere between the Fuginon and the Pentax in terms of brightness. Generally, an exit pupil of 2mm to 4mm is considered good for daytime use, 5mm or 6mm is appropriate for low light (dawn, dusk) and 6.5mm or more is needed for nighttime.

The cutaway shows a typical porro-prism system like the one used in the Steiner Commander above.

Coatings: The lenses of good binoculars are coated to enhance light transmission and reduce glare. Most companies are somewhat secretive about their coating materials and processes, but good glasses will have coatings on both sides of all the lenses. The best way to check the coatings is to try the binocular in low light. It should still produce a sharp image.

Lenses: Only smooth, hard lenses ground to the perfect curvature and finely polished will give sharp, clear images. And yet, good lenses are still hard to identify. That's because your eye automatically corrects for distortion. But when you look through poor lenses for a long time your eyes get weary from constantly refocusing, and this can lead to severe headaches.

There are two easy ways to test for lens distortion. First, focus on a straight edge. It should appear straight, not bent or curved. Then, focus on a flat image, like a picture. Both the center and the edges should be in sharp focus. If a binocular fails either of these tests, the lens is distorted.

Barrel alignment: If the barrels or optics are misaligned, it can cause partial image blackout and/or double vision. To identify an optical misalignment, make sure the exit pupils are perfectly round and centered. If they are, check for a barrel misalignment by focusing on an object. Look away for 15 seconds, then cover one side of the binocular with your hand and look back. Move your hand away from the lens. If the image is out of focus at first then comes into focus, the binocular is probably misaligned.

Prism type: All binoculars have

NIKON MONARCH ATB 8x40	BRUNTON LITE-TECH 8x25	FUGINON CD 10x42	SIMMONS EURODELUXE 10x30	PENTAX UCF MINI 10x21
Roof	Roof	Roof	Roof	Porro
BaK-4	BK-7	BaK-4	BaK-4	BaK-4
Diopter	Diopter	Center Diopter	Diopter	Diopter
Waterproof	Submersible	Submersible	Submersible	None
341 ft.	429 ft.	342 ft.	294 ft.	261 ft.
5mm	3.1mm	4.2mm	3mm	2.1mm
19.5mm	9.8mm	13mm	0	9.5mm
1 lb. 2 oz./6.6 in./5.1 in.	12 oz./4.25 in./5 in.	1 lb. 12 oz./5.6 in./4.9 in.	1 lb. 6 oz./5.5 in./4.75 in.	7.4 oz./4.1 in./3.2 in.
$420	$121.88	$750	$359.95	$120

either roof prisms or porro prisms. Roof-prism binoculars, like the Nikon Monarch ATB 8x40, have straight, round oculars. Porro prisms, such as the Steiner Commander, have 2-piece oculars with one piece offset. The roof-prism style tends to be more compact, while porro prisms offer greater image depth. But the differences are negligible.

Prism material: Most quality binoculars feature prisms ground from BaK-4, a type of optical glass that refracts very little light. Lower-cost binoculars often use BK-7 glass in their prisms. These prisms cost less, but they almost always cause vignetting, which is a slight clouding around the outside of the image. The Brunton Lite-Tech 8x25, for instance, is built with BK-7 prisms, but for occasional users with a tight budget it's worthy of consideration.

Field of view: All binoculars have a predetermined angle of view, which is the slice of a 360° circle they enclose. Usually this is expressed in terms of the field of view, or the width of the viewed area 1000 yards away from the binoculars. To determine the field of view, multiply the angle of view by 52.4 (the linear measurement, in feet, of 1° at 1000 yards). In the case of the Nikon 8x40, the angle is 6.5°, and the field of view is 341 ft. For full-size glasses 300 ft. is good. Compacts should offer at least 250 ft.

Of course, when you look through the binocular you appear to be much less than 1000 yards away, so the angle of view seems much larger. To determine this apparent angle of view, multiply the magnification by the real angle of view. If the product is greater than 60°, the binocular qualifies as a wide-angle lens. For instance, the wide-angle Bushnell Xtra-Wide 7x32 has a 13° angle of view, making the apparent angle of view 91° (7x13).

Eye relief: Binoculars project a viewed image to a point in space beyond the eyepiece. The distance from the eyepiece to that point is the eye relief. Eye relief usually ranges from as few as 6mm to as many as 20mm, and your eye should meet the image at that distance. Binoculars have eye cups that stick out past the eyepiece, so your eye is in the appropriate spot when you hold them to your face. If you wear glasses you should fold or slide the cups forward so your eyes remain at the right distance. This means longer eye relief is better for people with glasses. But as eye relief increases, field of view decreases, so if you don't need glasses you might look for a binocular with a shorter eye relief.

The new Bushnell Xtra-Wide 7x32 has a 700-ft. field of view at 1000 yards.

Focus: Higher-end binoculars have a central focus knob and a separate diopter control. These allow you to focus each ocular independently, so you can correct for the natural differences in vision between your eyes.

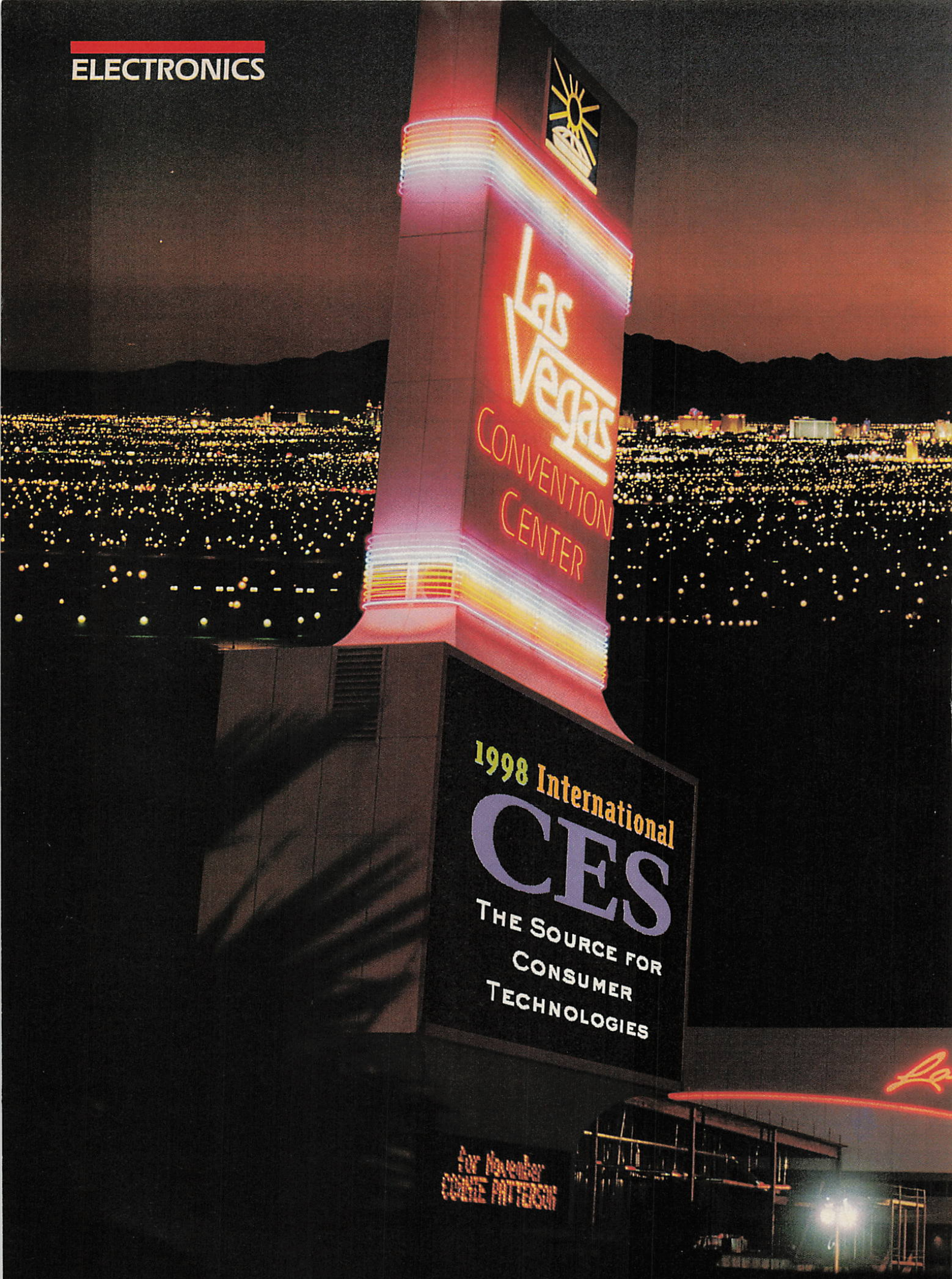
Autofocus or fixed focus binoculars are preset to a certain general focus specification and they provide fast, generally adequate focus. However, they don't allow you to correct for vision differences, and may not provide the razor-sharp focus you want.

Waterproof: There are several levels of waterproofness in regard to binoculars. "Splashproof" and "weather-resistant" usually mean the unit can tolerate a light dousing. "Fogproof" means the binocular has been vacuum-purged, filled with nitrogen and sealed with O-rings. "Waterproof" is the same as "fogproof," but the binocular is also submersible. Regardless, don't expose any binocular to water unnecessarily and dry it off after use in wet conditions.

Rubber armor: This casing provides a secure and comfortable grip and helps protect against impact and shock. It has nothing to do with water-resistance.

When shopping, consider the situations in which you actually use a binocular (ignore the "maybe" scenarios, as in "maybe I'll go orienteering in Belize next year"). What's the lighting usually like? Is it midday or dusk? Are water and temperature factors? Are you stationary or on the move? What's your budget? Even if you simply determine that you need a general, all-around binocular, you're better off starting out with that information than figuring it out afterward.

Then do some research. Talk to salespeople and seek out more information from the manufacturers. And never buy without at least an in-store trial. After all, it doesn't matter how big and clear a binocular reflects the world if you get robbed blind buying it. **PM**



PM PHOTO BY MARK LEWIS

DIGITAL DESERT

Our top picks from this year's Consumer Electronics Show in Las Vegas.

BY TOBEY GRUMET, Electronics Editor

● Other than blackjack tables, complimentary booze and general gluttony, Las Vegas really is good for something—the annual Consumer Electronics Show (CES). Every January, thousands and thousands of people crowd to the desert to do one thing (other than gamble)—talk about consumer electronics.

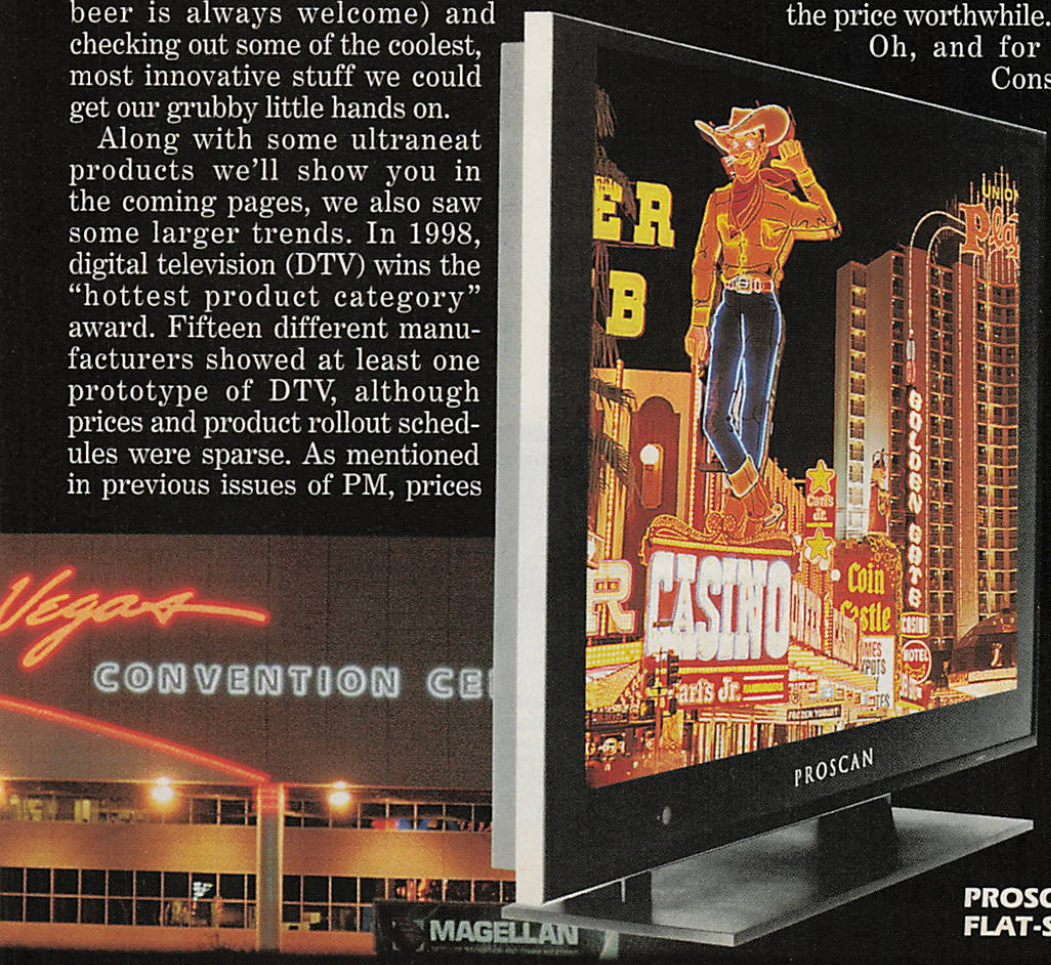
We here at POPULAR MECHANICS were right in the thick of things this year, walking the floor of the show, schmoozing at the parties (crudités and cheese cubes start to get pretty tiring after a while, though free beer is always welcome) and checking out some of the coolest, most innovative stuff we could get our grubby little hands on.

Along with some ultraneat products we'll show you in the coming pages, we also saw some larger trends. In 1998, digital television (DTV) wins the "hottest product category" award. Fifteen different manufacturers showed at least one prototype of DTV, although prices and product rollout schedules were sparse. As mentioned in previous issues of PM, prices for the first digital TVs are being placed at $5000 to $10,000. Quite a fistful of cash—but prices should go down after the first year or so.

Mitsubishi showed a 73-in. widescreen rear-projection DTV, which proved to be the largest we could find. Now we know size isn't everything, but the picture looked pretty darn good too. If you want a clear, bright, pretty picture, these digital televisions are right up your alley—but let's see if broadcasters release enough high-definition programming to make the price worthwhile.

Oh, and for you satellite fans, Thomson Consumer Electronics joined forces with DirecTV president Eddy Hartenstein, who showed the first satellite feed of a high-definition signal from his company's Castle Rock, Colorado, facility. Hartenstein proudly announced DirecTV's emergence into the world of high definition with two separate channels using 1080-line, interlaced-scan high-definition signals that will run on his company's satellite system. This, of course, brings you an interesting choice as cable companies struggle to make heads or tails of the whole digital story. The DSS signal can be displayed through Thomson DTV sets as well as converters with combo DSS, terrestrial DTV and NTSC receivers built in.

Then there's the MiniDisc. It's



PROSCAN PS4200W FLAT-SCREEN TELEVISION

PM PHOTO BY MARK LEWIS

hard to believe that after such a complete flop several years ago, this technology is back with a vengeance. But have no fear, MiniDisc is definitely here and hanging tough. It's small, neatly set in rugged plastic, and—best of all—digital. Units for playback and recording were shown by several manufacturers, including Sony, JVC, Kenwood, Denon, Aiwa and Sharp. As we've mentioned before, this is strictly a record-and-playback format. There are virtually no prerecorded MiniDiscs for sale in the United States.

As for the rest of the show, here are our hot picks.

Just a wave of the hand

They may not be digital, but two new hi-fi Sony SmartFile VCRs ($449 and $499) can do something quite intelligent. Just wave a videotape marked with a Sony SmartFile electronic indexing system label in front of the VCR, and the tape player's front panel will display the longest block of blank tape available. Then load the tape and the VCR will automatically fast-forward to that point. Pretty tricky, eh? If the TV is on, these VCRs can also display the tape's contents, showing program dates, durations, channels and times. Count your blessings—you may never have to stare at an unmarked tape in horror again.

SONY HI-FI VCR WITH SMARTFILE SYSTEM

Hey, watch the road!

Although mobile audio/video systems are no secret in Japan, Americans are just becoming exposed to this phenomenon. Keep the kids busy with a video, check out your navigation system or just listen to music with Pioneer's newest in-car "Visual Audio" product, which includes a tuner, 4-channel speaker outputs and a choice of two monitors. The main unit, the AVM-P505R, can be hidden under any seat or in the trunk to protect against theft. The monitors are full 5.5-in. color, while the audio section has a 40-watt × 4, 3-way/6-channel line level output with built-in subwoofer crossover. Inputs are included on the main unit for a CD player, video or game system, or a Pioneer navigation system. The system will be in stores by June, but prices haven't been disclosed yet.

Want some more bang for your buck? Clarion has teamed up with Microsoft to bring you a power auto PC system that can do just about anything but clean your windshields. The Clarion Auto-PC ($1299) integrates car audio, computing, navigation and wireless communications through hands-free voice activation, built right into the dashboard of your car. The system uses the Windows CE operating system and incorporates a Universal Serial Bus (USB) architecture, allowing for future connectivity to other USB products. The system is an AM/FM stereo with Digital Signal Processing (DSP) equalization, a 35-watt × 4-channel amplifier, Hitachi SH3 processor, USB 6-disc CD audio and CD-ROM drive, and backlit LCD screen. Also included is a point-to-point navigation system, a built-in address book and a mileage log. A driver can utilize all these features hands-free with the Auto-PC's text-to-speech application, which recognizes over 200 simple voice commands. Check out this muscular auto accessory when it hits stores in June.

PANASONIC PORTABLE DVD-L10

Zoom easy

There's nothing neater than a touchpad. And Sharp is using this technology for something altogether new—its camcorder controls! Sometimes it's hard to figure out all the different functions on a camcorder. Not so with the Sharp VL-PD1U ($2999.95). This model is a SlimCam digital camcorder using touchscreen operation to control basic camcorder functions such as play/record, zoom, focus and lighting changes. The touchscreen is a 4-in. color flip-out LCD. Want to zoom in? Just touch the image of your subject on the LCD and the camera will automatically zoom to the center of the screen. Talk about easy.

Movies to go

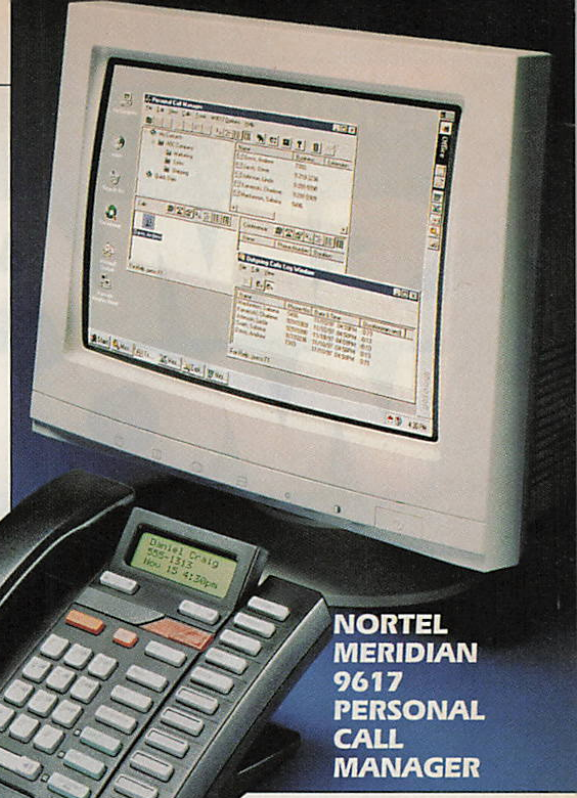
Weighing less than 2 pounds, Panasonic's portable DVD player, the DVD-L10 ($1299.95), is a traveler's dream companion. I don't know about you, but watching the movie shown on an airplane is

CLARION AUTO-PC

never a welcome proposition for me. The screen never seems to be positioned correctly, and for some reason they always have something I've either already seen or never had any interest in. It's a curse.

But the DVD-L10 can change all that. It's small, with a built-in LCD screen and a 2-hour nickel-metal-hydride battery. Although this limits which movies you can watch, the batteries are rechargeable. The screen is 5.8 in. wide and can accommodate a 4:3 or 16:9 ratio. It also includes a 10-bit video digital-to-analog converter. The audio can be enjoyed straight from the built-in speakers or through headphones, and it includes Virtual Surround Sound, a trick that simulates surround sound, from Dolby Digital-encoded software.

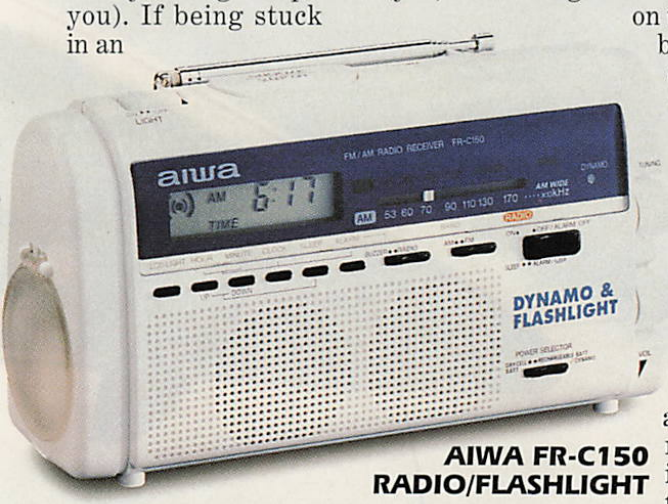
CIDCO iPHONE COMPUTER PHONE



NORTEL MERIDIAN 9617 PERSONAL CALL MANAGER

Emergency radio

Everyone's got a phobia (yes, even you). If being stuck in an emergency with no light or radio is one of your secret fears, Aiwa's FR-C150 ($59.95) emergency radio may be your dream come true. The power options are available in case of emergency: an AC adapter, batteries or built-in generator. To use the generator option, crank the handle on the side of the radio for one minute and behold—30 minutes of music will be yours. Along with the AM/FM tuner, a flashlight is built in. Great for camping or outdoor excursions.



AIWA FR-C150 RADIO/FLASHLIGHT

Intelli-phones

Let's call them phones with personality. These ultrasmart telephones with advanced options and even computer functions can certainly make communications easier. Take the Nortel Meridian 9617 ($329), a USB 2-line telephone. This product includes a call-management software package called Personal Call Manager. Just hook the phone to your PC and check out all incoming call information, such as call waiting and caller ID, as well as a bitmap photo and recorded voice tag—all on a special pop-up window on the screen. Everything can be managed through your computer if you choose, which brings a certain amount of added control to your home office.

Cidco Inc. also announced a new smart phone at CES called the iPhone ($499). Instead of logging onto your computer, with this gadget you can send or receive e-mail as well as access any Web site you desire—right on the phone's built-in 7.4-in. touchscreen. It's the first of its kind to use graphics and not just text. The phone includes a pull-out keyboard, built-in directory, speakerphone, caller identification and 3-way conferencing.

The data delivery speed is marked at 28.8-kbps or higher, making Web surfing nice and easy.

Hang it up

I know, I know, we've been talking about flat-panel plasma TV sets for years now. But this year, these futuristic plasma TV monitors looked better than ever. Not only can you save space with these funky thin models, but it's like having your very own movie theater when you hang it on a wall. Thomson Consumer Electronics showed us its 42-in. widescreen plasma color TV monitor, and it looked pretty darn good. Only 4 in. thick, the monitor is still a prototype, but it includes several input jacks for a VCR, DVD or satellite DSS system—remember, there's no tuner. It also includes a built-in stereo amplifier. Look for the first product in late 1998. No pricing has been announced for the plasma monitor just yet. **PM**

SHARP VL-PD1U SLIMCAM TOUCHSCREEN DIGITAL CAMCORDER

SMALL WORLD

The world's carmakers are making tiny cars for full-size people. But you can't get them here.

BY DON CHAIKIN, Automotive Editor

● As you read this, there are people elsewhere in the world driving around in cars that could fit on top of your dining room table. Honest.

We live in a relatively young land. We're used to big spaces and fuel that costs less per gallon than bottled water. However, there are many places where the real estate is the only thing more precious than the fuel. Towns that date back to the Middle Ages don't have too many wide boulevards for cruisin'. Cities that have more people per sq. ft. than Times Square on New Year's Eve don't have many places to park your basic Winnebago. And in many countries it costs more for a *liter* of no-lead than you'd ever pay for a *gallon* of premium here.

It's for locales like these, rather than anywhere in the States, that the world's carmakers have been designing, building and selling "micro-sized" cars. Though they're small—very small by our SUV-oriented standards—they're all real cars and do everything real cars do. However, given the realities of North America and what we need and want automotively, these small cars aren't likely to do what they do here any time soon. Here's a collection of the most recent and the most interesting of those that may soon be.

MERCEDES-BENZ A-CLASS

When Mercedes-Benz jumps into a market with both feet, that market segment gains instant respectability. So the introduction of the A-Class is highly significant. First shown to the world just last October at Frankfurt's auto show, the A-Class has already been out for sale, bought, recalled by Mercedes for a stability problem, fixed and sent back out for sale again. With its innovative front-drive powertrain tucked partially beneath the front floor, A-Class offers seating for five. The car also offers a much higher level of comfort, refinement and luxury than people would expect in this micro-car class, including antilock brakes and stability control (possibly necessary due to an early rollover problem). The diminutive A-Class also boasts the Mercedes-Benz star, which means, among other things, that it offers the same level of occupant protection as "regular" Mercedes automobiles. Along with its structural rigidity, A-Class has dual front- and side-impact airbags.

Only 140.5 in. bumper to bumper, A-Class is available with drivetrains ranging from 60 to 102 hp.

FORD KA

The Ford Ka was shown as a concept car in 1994 at the Geneva auto show, and European drivers have been buying and driving the car for about two years now. Stretching 96.4 in. between its front and rear axles, the 4-passenger, 2-door hatchback is 142.5 in. long. Its nicely curvy body is 64.2 in. wide and the roof is 53.9 in. off the road. In its base form, the car weighs in at 1900 pounds.

Ka is powered by a 1.3-liter 4-cylinder pushrod engine that develops 59 hp in standard trim, though a detuned version that's good for 49.6 hp is available in certain markets. Ka comes only with a 5-speed manual gearbox. The drivetrain, suspension and entire Ka platform are all based on Ford's Fiesta, which is not sold in the States anymore—a strong hint that Ka won't be any time soon, either.

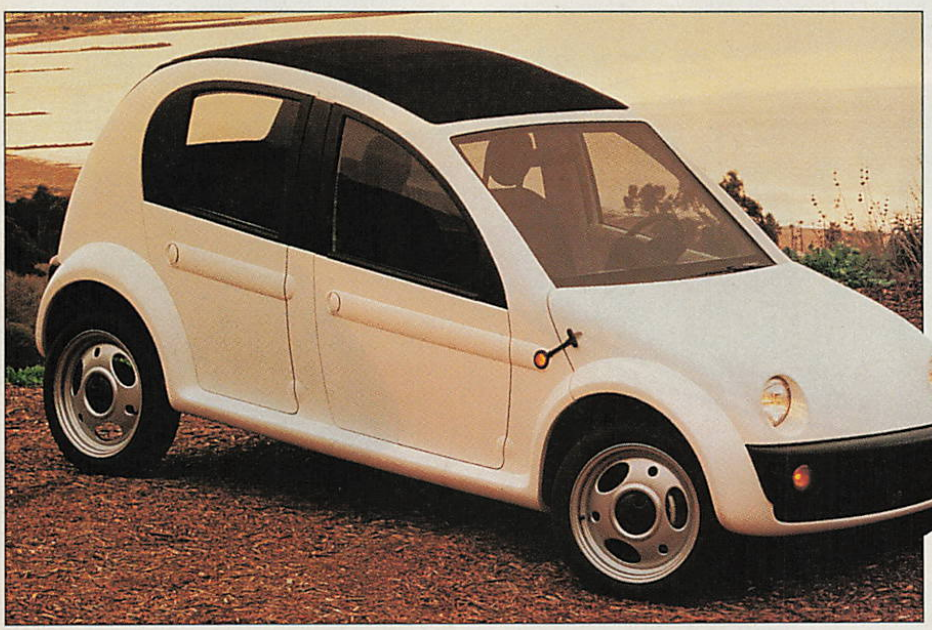
The Ka lacks rear doors or an automatic transmission, but its options do include ABS, a CD player, power steering, air conditioning and a passenger-side front airbag.

HYUNDAI ATOS

Adhering to the "form follows function" school of design, Hyundai has created what amounts to a very mini minivan. Named Atos, the car sits on a 93.7-in. wheelbase and has an overall length of only 137.6 in. However, with its tall, square minivan-like 63.7-in.-high roofline, Atos offers 40.6 in. of front headroom and 38.4 in. of rear headroom—numbers that would make a Toyota Camry envious.

Atos is powered by a new Hyundai-developed engine, a 3-valves-per-cylinder 1.0-liter that's good for 55 horsepower. (The Korean market gets an 800cc version.) The engine can be mated to either an electronically controlled automatic or a 5-speed manual that can have an automatic clutch: When the driver lifts his foot from the accelerator, the clutch disengages automatically. It re-engages when he steps back on the gas. Hyundai has also shown an early, "developmental" electric version of Atos.

CHRYSLER CCV



The most innovative and future-thinking of all tiny cars is Chrysler's Composite Vehicle, or CCV. More important than the car's size—144 in. long—is the fact that it weighs only 1200 pounds because its body is made of molded thermoplastic. Other than its hood and front fenders, the primary body of the CCV is made up of only five parts. Two inner and two outer plastic body sections are bonded with adhesive and then the body unit is dropped onto a rolling steel chassis.

Made of polyester-based resins similar to those used in soft-drink bottles, the thermoplastic body of the CCV is entirely recyclable. It also does not need to be painted, since color can be added to the mix as the car is being molded. Though Chrysler may never sell a single CCV, it may well build Intrepid-size cars out of plastic in the future.

TOYOTA FUNTIME

They ain't no T-Birds, but Toyota's minis may have their roots in some Beach Boys lyrics: "fun, fun, fun." The three cars, named the Funtime, Funcoupe and Funcargo, are all built on the same 94.5-in. wheelbase. Funtime, shown here, is the 4-door hatchback version and the smallest, with an overall length of 142.1 in.

Toyota hasn't announced a powerplant for the platform. However, since most cars in this segment that are sold in Europe have engines between 1.0 and 1.2 liters, it's a safe bet that the Funtime and its brothers will too, especially considering that they are the work of Toyota's Brussels design center. However, given Toyota's extensive work on alternate-fuel engines, don't be surprised to see an electric or hybrid driving Funtime's wheels.

SMART CAR

How about a new-car dealership with a display of its models stacked outside in a glass column, like watches at a discount jewelry counter? It's coming soon, courtesy of Smart, the product of Mercedes-Benz engineering and Swatch watch marketing and flair.

Designed to carry two people in relative spaciousness, Smart is a whopping 98.5 in. long. But it sits on a 70.9-in. wheelbase. Smart is 57.1 in. wide and 61 in. tall, and weighs 1500 pounds.

The entire powertrain—supercharged 3-cylinder 54-hp 600cc engine and driver-shifted automatic transmission—is mounted under the floor between the rear wheels. This allows for the Smart's flat floor and its relatively long wheelbase—and a surprisingly roomy 2-person passenger compartment.

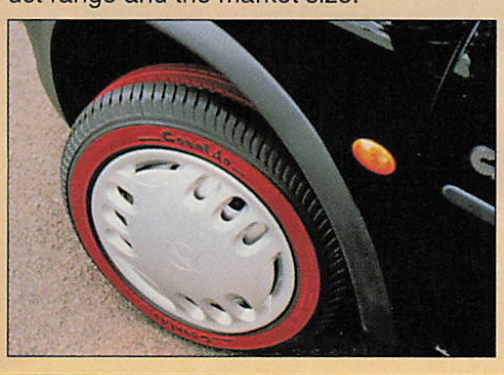
AUDI AL2

Still called a "design study" by Audi, the Al2 is a 4-place 4-door that boasts extra-low weight thanks to its aluminum construction. The Al2's aluminum body panels attach to an aluminum space frame, much the way the company's luxurious A8 sedan is built. In the case of this stubby and rounded minicar, those panels go together to form a body that has an extremely slippery 0.25 drag coefficient.

Despite its seating for four, the Al2 is all of 148.2 in. long and sits on a long—for its size—94.7-in. wheelbase. Giving the car its attractive and solid-looking stance are its imposing 63.8-in. width and 61.3-in. height. Power for the 1700-pound Al2 comes from a direct-injection 1.2-liter 3-cylinder gasoline engine that develops 75 hp. The power goes through a Tiptronic 5-speed automatic transmission.

ANYTHING BUT BLACK

● Cute small cars deserve cute small tires. At least Michelin hopes so. So the huge French tiremaker is test-marketing a line of colored tires in France, Germany and Italy. Called the Coraldo, the line currently consists of two sizes in three colors: Rio Yellow, Etna Red and Nordik Green—each brighter than your average MTV guest host's party wear. These tires have more than just brightly colored sidewalls—they also sport matching treads. Engineers can add the color because of a new proprietary process that replaces the carbon black in the tire recipe with other neutral-color ingredients like silica. Depending on the test's success, Michelin might consider expanding both the product range and the market size.



MINI

Godfather and namesake to all minicars, the Mini was launched in 1959 under the Austin and Morris brands of the now-long-gone BMC. Mini pioneered the concept of a small-outside, big-inside car with its compact, transversely mounted drivetrain sitting between the front wheels. A product of the late Sir Alec Issigonis, Mini has survived the vagaries of the British economy, changes in corporate ownership, and countless shifts of automotive tastes and style. And Rover Group, Mini's current owner, has announced a new car for the new millennium.

The new Mini will be powered by a new 4-cylinder engine developed jointly by BMW (Rover's owner) and Chrysler Corp. It will be larger than today's car, which measures 120 in. long, 61.4 in. wide and 52.8 in. tall, and sits on a wheelbase that's 80.3 in. PM

The new Dodge Durango has more passenger room than any other sport utility in its class.† Enough room, in fact, for up to eight people when you choose the optional third row.

Now you seat them.

Durango's Fold-and-Tumble™ seating system is so ingenious, we're patenting it. And it's as easy to use as it is to say.

Durango's wheelbase is the longest in its class.† Its track is the widest. Its frame is the strongest. So the going is stable and predictable. Even when the road beneath you isn't.

To help passengers keep their cool, Durango offers a separate rear compartment cooling system.

Fold Durango's seats down, and you've got a nearly flat loading surface for up to 88 cubic feet of cargo. That's more cargo area than anything else in the class. (You could say we've sent those other guys packing.)

Now you don't.

Listen up. Durango offers a premium stereo system with Infinity® speakers and both CD and cassette.

Even with Durango's standard dual airbags, you should still always wear your seat belt. To make you more comfortable doing the right thing, we provide outboard shoulder belts that adjust for height.

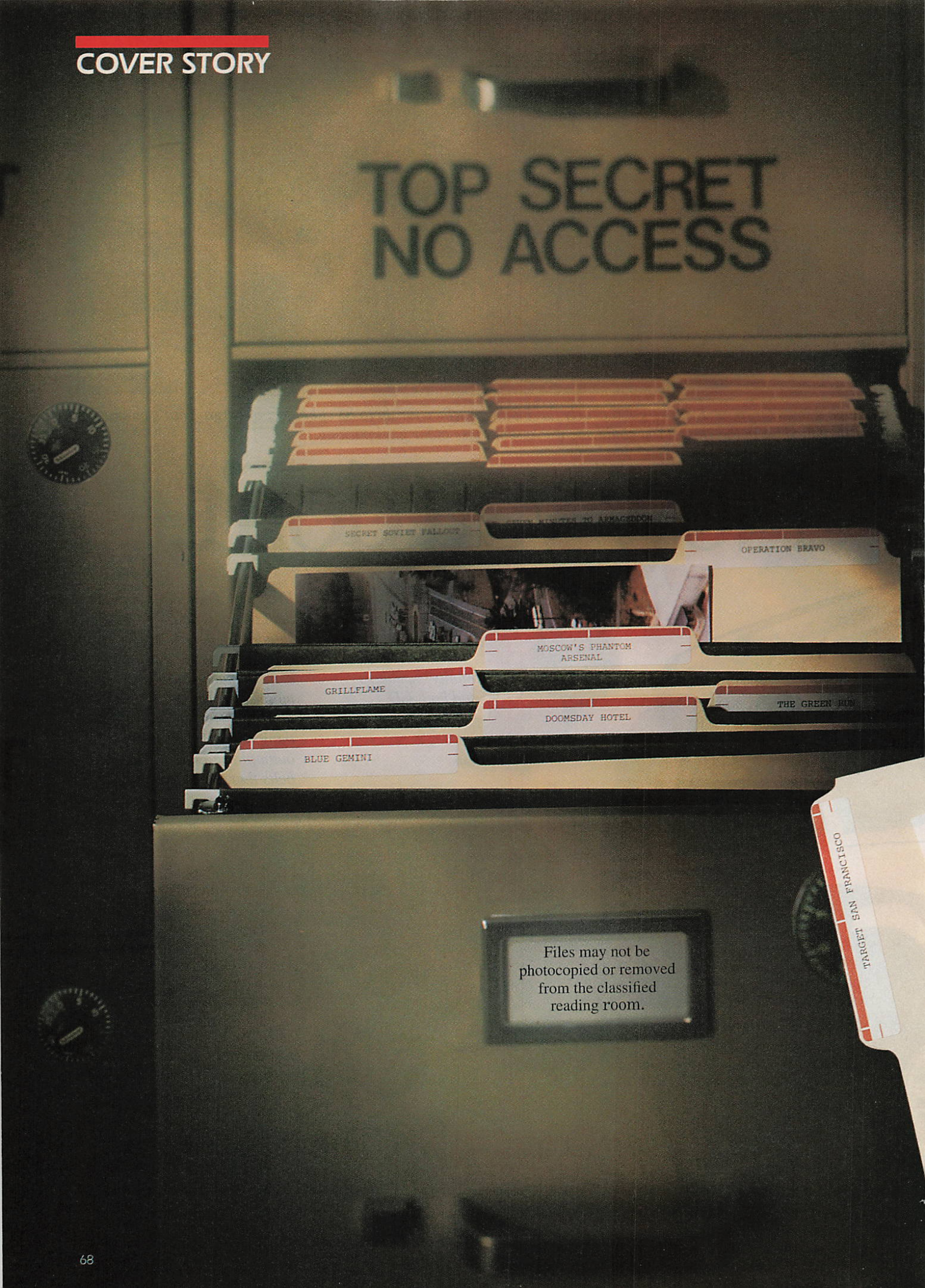
How do you top best-in-class passenger and cargo room? With a standard roof rack, of course.

Durango **The New Dodge**

For more information, call 1-800-4-A-DODGE or visit our Web site at www.4adodge.com

†Available feature comparisons vs. domestic compact SUV models. Excludes other Chrysler Corp. vehicles. All comparisons based on data available at time of printing.

Always use seat belts. Remember a backseat is the safest place for children.


TOP SECRET
NO ACCESS
SECRET SOVIET FALLOUT
OPERATION BRAVO
MOSCOW'S PHANTOM ARSENAL
GRILLFLAME
DOOMSDAY HOTEL
BLUE GEMINI
TARGET SAN FRANCISCO
Files may not be photocopied or removed from the classified reading room.

GREATEST SECRETS OF THE COLD WAR

They read like plots from thrillers, but each of these chilling events actually happened.

BY JIM WILSON, Science/Technology Editor
PM Photos by Brian Kosoff

● Unsuspecting civilians are doused with radiation and germ weapons. Intelligence agents recruit psychic spies. Generals plan an attack on a Chinese nuclear weapons plant. A phantom army triggers the largest arms buildup in history. Politicians secretly construct an underground city to escape fallout. The United States comes within 7 minutes of launching its ICBMs.

No, these aren't screenplays that were junked when the Soviet Union went belly up. Each of these events actually happened. For the two generations of Americans who fought and financed the Cold War, it was an epic struggle between us good guys and the "evil empire." Now, as the epoch fades into history, the declassification of tens of thousands of pages of secret documents has begun to cast a penetrating light on the era. As nine of these files reveal, truth *can* be stranger than fiction.

TOP SECRET

Target San Francisco

Most people remember the Cold War as an era when the greatest threat was a nuclear strike launched by a foreign power. In reality, Americans were also at risk from testing by their own military.

In addition to nuclear weapons, the U.S. military feared an attack by an enemy employing less publicized technologies. The most serious scenario was a biological warfare attack mounted against a seaboard city from a submarine or a small, fast patrol boat.

According to declassified records, the Pentagon attempted to estimate how cities might be damaged by such an attack by ordering the U.S. Navy to spray a cloud of supposedly harmless bacteria over San Francisco.

Historians say local health records show an upsurge in cases of a pneumonia-like illness after the 1950 experiment. They also claim that one death was caused by the attack.

In 1966, the Pentagon ordered the U.S. Army to launch a similar biological attack on the New York City subway system. Details of this experiment remain classified.

UPI/CORBIS-BETTMAN PHOTO

TOP SECRET

Operation BRAVO

A generation ago, the White House was gripped by reports that "Red" China was preparing to build its own nuclear weapons. Top officials considered several strategies to stop the Chinese program.

In 1963, Gen. Maxwell Taylor, then chairman of the Joint Chiefs of Staff, planned Unconventional Warfare Program BRAVO. It called for the United States to prevent the People's Republic from building a nuclear weapon by launching a secret attack against a weapons plant in north central China. The attack was to be carried out by a nonnuclear bombing mission or a 100-man sabotage team made up of Chinese Nationalists.

The plan was vetoed on the urging of the State Department. China went forward with its nuclear weapons program, exploding its first device (right) at its Lop Nor test site on Oct. 16, 1964.

TOP SECR

ESP Troopers

One of the strangest files reveals the use of psychics as spies. The CIA-financed project—code-named GRILLFLAME—was conducted at the Stanford Research Institute (SRI), beginning in the early 1970s. The CIA says its ESP troopers, who used sensory deprivation (left), never produced useful information. Yet the project may still have been a success.

It turns out that for two decades Stanford University had also worked on a secret over-the-horizon radar (OHR) system to spot Soviet ICBMs seconds after launch.

The OHR system operated at the same microwave frequencies the Soviets believed were responsible for brain waves. For reasons he later said he never understood, OHR inventor Oswald G. Villard Jr. found himself assigned to GRILLFLAME.

Some speculate that the ESP troopers were a ruse to divert Soviet spies away from OHR.

AP/WIDE WORLD PHOTO (TOP LEFT; U.S. D.O.E./RICHMOND OPERATIONS OFFICE (TOP RIGHT); *THE SKEPTICAL INQUIRER* PHOTO (BOTTOM LEFT); AP/WIDE WORLD PHOTOS PHOTO (BOTTOM RIGHT); MINOX CAMERA COURTESY OF THE LENS & REPRO EQUIPMENT CORP.

TOP SECRET

The Green Run

Soon after the Soviet Union exploded its first nuclear bomb in August of 1949, the United States decided it needed to learn more about the types of weapons its enemy was building. To find out, the Air Force conducted the Green Run experiment at the Hanford nuclear production plant (right).

On the night of Dec. 2, 1949, the plant "released three tons of irradiated uranium fuel that had been allowed to cool only 16 days," reports a declassified Department of Energy document. The release—aimed at duplicating pollution from a Soviet reactor—placed more than 7800 curies of radioactive iodine, well-known to concentrate in human thyroids, into the air of the Pacific Northwest. By comparison, the accident at Three Mile Island released only 15 curies of radioactive iodine.

OP SECRET

Blue Gemini

Americans know NASA's Gemini program as a followup to the Mercury manned orbital missions. Few know about a shadow effort, Blue Gemini, that sought to recruit NASA technology and astronauts to fly military missions.

At first, NASA warmed to the idea of sharing launch costs in exchange for allowing Air Force officers to fly as copilots. Documents suggest the military had offered NASA as much as $100 million. But as senior officers began laying out the details of their proposed operations, administrators of the civilian agency became less and less enamored with the idea of using astronauts as high-flying military observers.

As with the proposed Operation BRAVO attack on China's nuclear weapons plant, State Department reservations would eventually quash the plans to militarize NASA's manned space flight. Blue Gemini would never fly.

TOP SECRET

Doomsday Hotel

Beginning in the 1970s, curious tales began to emerge from Washington, D.C., about a "doomsday hotel." Located near the nation's capital, it was said to be the ultimate fallout shelter. But only for the well-connected.

In congressional testimony, military officials acknowledged the shelter—called Mount Weather—existed, but refused to disclose its whereabouts, lest it be targeted by a Soviet ICBM.

With everyone's ICBMs now targeted at the open sea, the location of Mount Weather (right) has been revealed to be in Berryville, Virginia, about 75 miles from Washington.

Today it houses the computer and phone-system hubs for the Federal Emergency Management Agency.

In 1995, the existence of a second doomsday hotel, located beneath the Greenbrier Resort in White Sulphur Springs, West Virginia, was revealed. It is now open to group tours.

DOOMSDAY HOTEL

TOP SECRET

TOP SECRET

Secret Soviet Fallout

The Russian government has acknowledged that a long-rumored series of accidents at Soviet nuclear weapons plants actually did take place.

These events occurred beginning in 1948 at the Mayak complex in the southern Ural mountains, where the Soviets operated seven plutonium production reactors. Soviet records reveal that these events released into the air more than five times as much radiation as that produced by all the world's 500 above-ground nuclear tests *plus* the major nuclear accidents at Chernobyl and Windscale (now Sellafield), England (in 1957).

While the report may be new to the public, it was old news to the U.S. government. A highly secret monitoring unit called the Air Force Technical Applications Center has been operating a long-range detection program to monitor Soviet fallout for 50 years.

SECRET SOVIET FALLOUT

TOP SECRET

FEMA PHOTO (TOP LEFT); U.S. DEFENSE DEPARTMENT/*SOVIET MILITARY POWER* ILLUSTRATION (TOP RIGHT); AP/ERIC DRAPER PHOTO (BOTTOM RIGHT)

Moscow's Phantom Arsenal

During the 1980s, the rationale for the United States undertaking the largest weapons buildup in history was detailed in a widely circulated Defense Department document titled *Soviet Military Power*. The report estimated that the Soviet Union commanded weaponry that exceeded the U.S. arsenal in every category.

It turns out many of those weapons never existed. Declassified CIA estimates of Soviet military power suggest the Defense Department's fears were caused by a phantom arsenal of nonexistent weapons. One example: The much-feared improved T-80 tank never existed. It appears analysts mistook an outmoded T-72 retrofitted with armored fabric side skirts for a new weapon.

In fact, the Soviets weren't even maintaining the weapons they did have. At a press conference late last year, Gen. Eugene Habiger, top commander of the U.S. Strategic Command, acknowledged that during the 1980s "the Russians weren't modernizing their forces as we were." As a result, "The service life of their systems is coming to an end." **PM**

7 Minutes To Armageddon

If you've ever had to give your boss really, really bad news, you can imagine how officers in Cheyenne Mountain, Colorado, felt when their radar screens lit up with 2200 Soviet missiles.

The "launch on warning" protocols required confirmation, followed by the immediate notification of then-President Jimmy Carter. When other tracking stations reported all clear, the mystery deepened. With supposedly only 7 minutes left to launch U.S. ICBMs, the mystery was solved. Someone had put a training tape on the wrong machine—it was literally a textbook attack.

After the 1979 incident, the Air Force moved its training operations to another location, and it has since upgraded its tracking center (right).

OUR LATEST

Ford Credit

*Based on an average of consumer-reported problems at 3-months' ownership in a survey of Ford and competitive models designed and built in North America. Sales leadership based on Divisional sales.

- WORLD'S ONLY STANDARD THIRD DOOR • LARGEST FULL-SIZE PICKUP BOX BY VOLUME
- TRITON™ V8 ENGINES ARE THE ONLY LINE OF PICKUP ENGINES WITH FAIL-SAFE COOLING
- MOST POWERFUL STANDARD V6 ENGINE AVAILABLE IN A FULL-SIZE PICKUP

REMODEL OFFERS PLENTY OF SQUARE FOOTAGE AND THE FRENCH DOORS AT NO EXTRA CHARGE.

FORD F-SERIES.
THE BEST-BUILT, BEST-SELLING AMERICAN TRUCKS.*
1-800-258-FORD or www.ford.com

BUILT Ford TOUGH

SLINGIN' LEAD

From guns to garb, cowboy shooting takes you back to the Old West.

BY MIKE VENTURINO
Photos by Mike and Yvonne Venturino

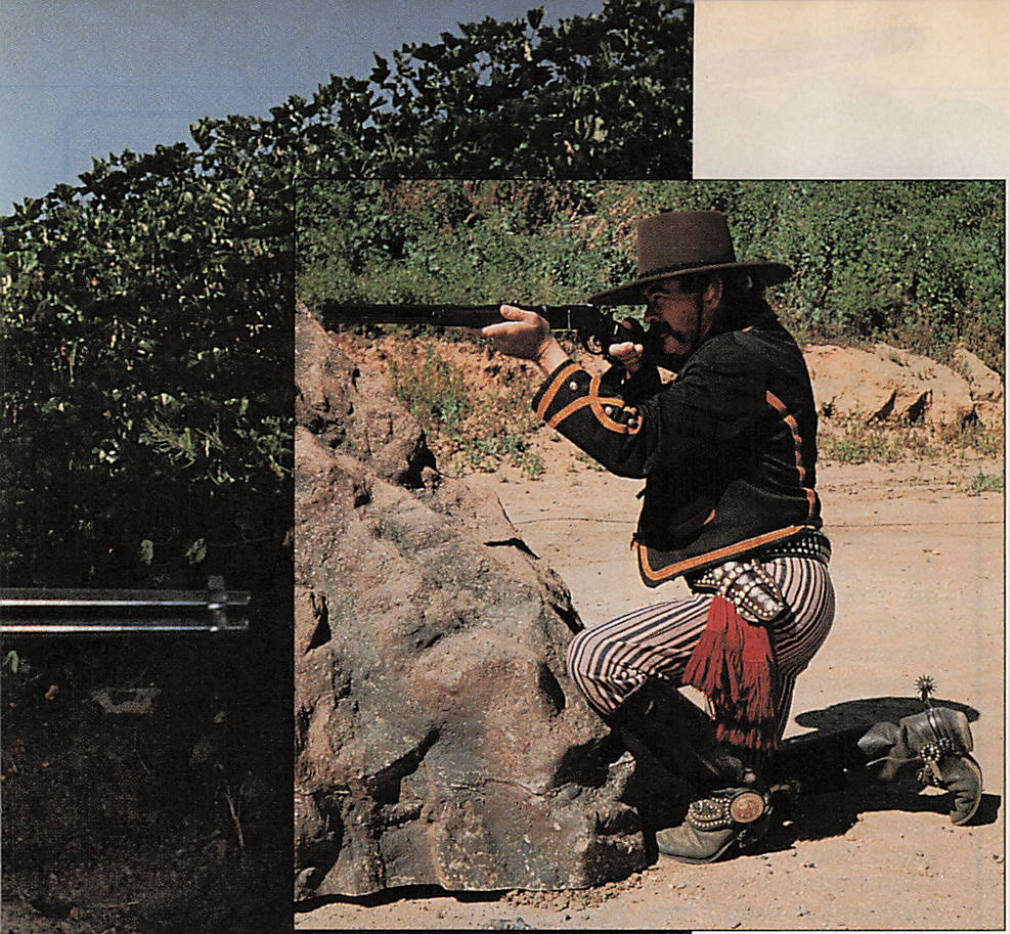
● In a blur of movement, the cowboy jumps up, draws his gun and starts spraying hot lead around the saloon. As he hammers away, the bad guys begin to fall. The first six-gun empties, and the cowboy pulls out a second. But even when that one is spent, he's not out of danger.

He grabs a shotgun off a nearby table and blasts his way toward the exit, firing so rapidly that the gun's side-by-side barrels sound nearly as one. When he finally clears the room and kicks open the double swinging doors, there's more trouble outside: Another band of outlaws lines the street. To make matters worse, he's out of ammo.

Amid a jangle of spurs and a swish of chaps leather, he runs to his horse, where his trusty Winchester rifle waits. Whisking it clear of the scabbard, he levers in the first round and lets fly, swinging the gun from side to side with incredible speed and accuracy. At last, he squeezes off his final shot. Breathing hard, he waits for the dust to settle. His heart sinks.

One of the bad guys is still standing.

This may sound like a scene out of the 1890s, but it's a real-life scenario that's occurring with more and more frequency in the 1990s. These days, though, the cowboy is really an accountant or schoolteacher and the bad guys are metal targets that fall over or emit a



loud *ping* when hit. The gunfight is pure fantasy, but the guns are the real thing. These Wyatt Earp wannabes are firing away with the guns that won the West—either well-cared-for vintage specimens from the 1800s or recently manufactured replicas.

It's all part of the biggest trend to hit the firearms world in years: cowboy action shooting. During the past decade, clubs dedicated to cowboy shooting contests have been organized in no fewer than 40 states within the United States and in such unlikely and far-off-sounding locations as the Netherlands, Spain, Finland, England, New Zealand and Australia. There are two separate governing associations, the Single Action Shooting Society (SASS) and the National Congress of Old West Shootists (NCOWS). Each establishes its own rules so its respective members can compete equally. SASS, the larger of the two, has approximately 15,000 members worldwide and estimates that about 50,000 people actually participate in the sport.

While action-type shooting competitions have been around for decades, they've never been this popular. They evolved from law-enforcement training programs in which officers walk through simulated settings with hidden targets. What makes these games so much fun is the action: Not only do the competitions require fast and accurate shooting, but the competitors are on the move and forced to think on their feet. The cowboy version of action

These two cowboys aren't shooting at each other, just against each other in a cowboy shooting match. Note the bone-handled revolver (left) and the natty threads (inset). Authenticity is the goal, and the revolver and holster at right would make any gunslinger proud.

shooting adds the allure of shooting vintage firearms that were designed 100 years ago or more.

For handguns, cowboy shooters use single-action revolvers only. These require you to cock the hammer manually before you can pull the trigger. Rifles and carbines (a shorter, lighter version of a rifle) must be of the type introduced prior to 1899. They can be either lever-action or slide-action, and must have exposed hammers and feed from tubular magazines. Furthermore, rifles can only be chambered for pistol-size cartridges, as were most Winchester, Colt and Marlin repeating rifles made during the late 1800s.

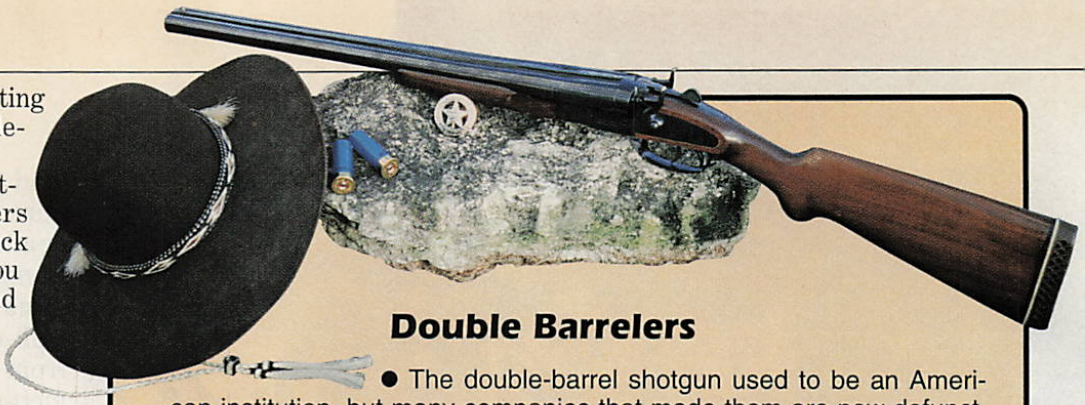
This is a great benefit to cowboy shooters because it allows them to carry only one caliber ammunition for both their handguns and rifles/carbines, which is lighter and easier. Interestingly, no 1800s-vintage repeating rifles were chambered for .45 Colt caliber for technological reasons. Those obstacles have been overcome by today's gunmakers, and the caliber now flourishes in lever-action rifles and carbines.

SASS rules require lead-alloy bullets, which fragment easily upon impact with the steel targets. Velocity levels must be between 650 fps (ft. per second) and 1000 fps for handguns, and a maximum of 1400 fps for rifles. Both requirements are meant to prevent damage to expensive steel targets and to minimize the danger of fragments rebounding back towards bystanders.

One survey estimated that cowboy action shooters fire about 24 million rounds a year. No wonder both Winchester and Black Hills produce ammunition specially constructed and packaged for cowboy shooters.

Shotguns receive perhaps the least attention of all cowboy action firearms, but that doesn't make them any less authentic or important a part of the cowboy arsenal. Competitors can use any shotgun with side-by-side barrels (sans automatic ejectors) or any pump-action or lever-action shotgun with an exposed hammer. Modern replicas of such guns are allowed.

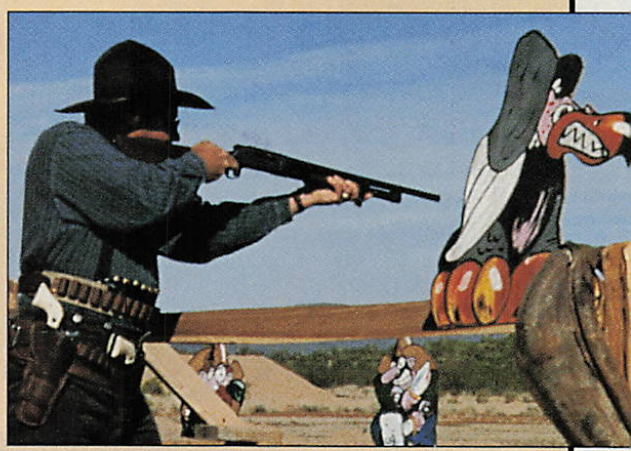
But the guns are only part of the total frontier experience. The courses of fire are another attraction. No one knows what to expect when attending a cowboy action shoot. Stages are limited only by their designers' imaginations. Competitors may be expected to shoot from fake horses that roll along on tracks, from the tops of stagecoaches, from inside buildings looking out or outside buildings looking in, while sitting in barber chairs, or even while wearing trick goggles that give them



Double Barrelers

● The double-barrel shotgun used to be an American institution, but many companies that made them are now defunct. You can still find double-barrel shotguns for very reasonable prices on used-gun racks in gun stores or at local gun shows. Some newly manufactured double-barrel shotguns from Brazil and Spain are being imported. Prices are usually under $400. Vintage Winchester Model 1897 pump-action shotguns are also available on the used-gun market and are comparably priced.

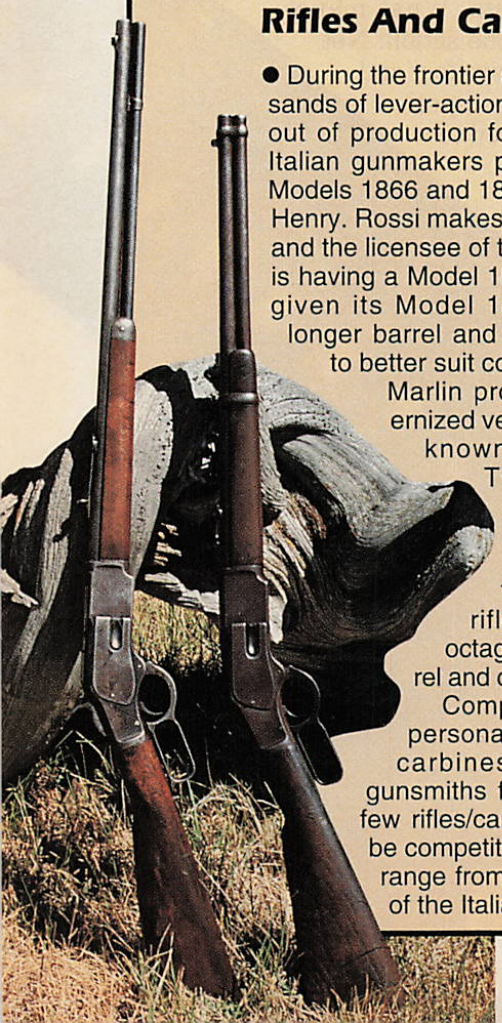
Any shotgun gauge between 20 and 10 is allowed. The chambers are often honed smooth so shooters can extract fired shells by giving the opened double-barrel a quick backwards flip.

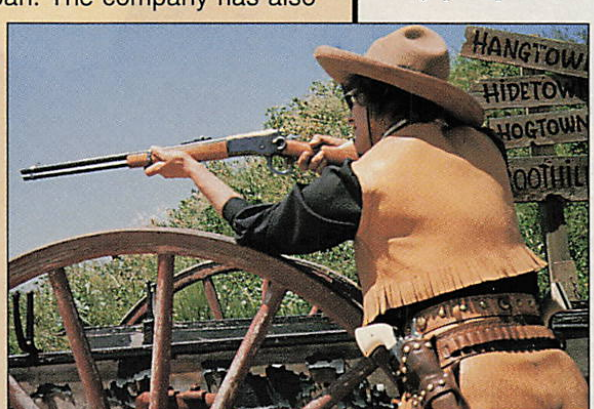


A classic double-barrel shotgun awaits its turn (top), while one hombre blasts away with a pump-action.

Rifles And Carbines

● During the frontier era, Winchester produced hundreds of thousands of lever-action rifles and carbines. These guns have been out of production for at least 50 years, but several Northern Italian gunmakers produce quality replicas of the Winchester Models 1866 and 1873, and their predecessor the brass-framed Henry. Rossi makes a good copy of the Winchester Model 1892, and the licensee of the Winchester name, U.S. Repeating Arms, is having a Model 1892 made in Japan. The company has also given its Model 1894 carbine a longer barrel and magazine tube to better suit cowboy shooters. Marlin produces a modernized version of its well-known Model 1894. Two years ago the company introduced a special Model 1894 "Cowboy" rifle with a 24-in. octagon-shaped barrel and checkered stock. Competitors seldom personalize their rifles/carbines. Some go to gunsmiths for mechanism smoothing, but surprisingly few rifles/carbines require any modifications in order to be competitive. Retail prices on the guns described here range from $360 for the Rossi to about $800 for some of the Italian reproductions.





At rest and in action, authentic lever-action rifles and carbines.

double vision. They may have to run, jump, skip or roll on the ground to get to their guns, or shoot a revolver with one hand while the other is handcuffed to a post.

Scoring is based on speed and accuracy. Electronic timers count the passing seconds as the shooter fires and stop automatically with the last shot. A missed target costs the shooter a 5-second penalty. The score is the raw time for shooting plus 5 seconds for each missed target. Whoever has the fewest points at the end of the day wins.

But winning in this case isn't everything—in fact, it's hardly anything. Since even the top contestants shoot for glory instead of cash purses, the sport is refreshingly free of a dog-eat-dog competitive mentality. Camaraderie is king, an attitude enhanced by the crowd's shared interests: classic firearms, Old West history and vintage attire.

As much as a competition, a match is a chance for a cowboy shooter to get decked out in colorful frontier clothing, go by his alias—Dead Eye Dick, Curly Bill, etc.—oil up his smokepoles, and take to the dirt-filled streets of yesteryear.

And cowboy shooting's not just for men. At any given match, as many as 25% of the competitors are women, most of whom are avid shooters and gun collectors. With mom and pop both attending, junior shooting categories are a natural outgrowth, and cowboy shooting has emerged as a genuine family affair.

The amazing array of costumes and the fast-moving shooters firing away amid ringing and falling targets have also made cowboy shooting a significant spectator sport. SASS's official 1997 World Championship Of Cowboy Action Shooting, held last April in Southern California, hosted 528 competitors and more than 15,000 spectators. So even if you're not a shooter, cowboy action shooting still has something to offer.

Maybe you should check it out for yourself, pardner. **PM**

SOURCE LIST

For more information, contact:

- NCOWS, P.O. Box 221, Cedar Falls, IA 50613; 319/266-3014
- SASS, 1938 N. Batavia St., Ste. M, Orange, CA 92865; 714/998-1899

Above right: Cowboy action shooters have to take aim from some pretty peculiar places—even a barber's chair. Below: Some say looking authentic helps you shoot well. Below left: The Peacemaker.

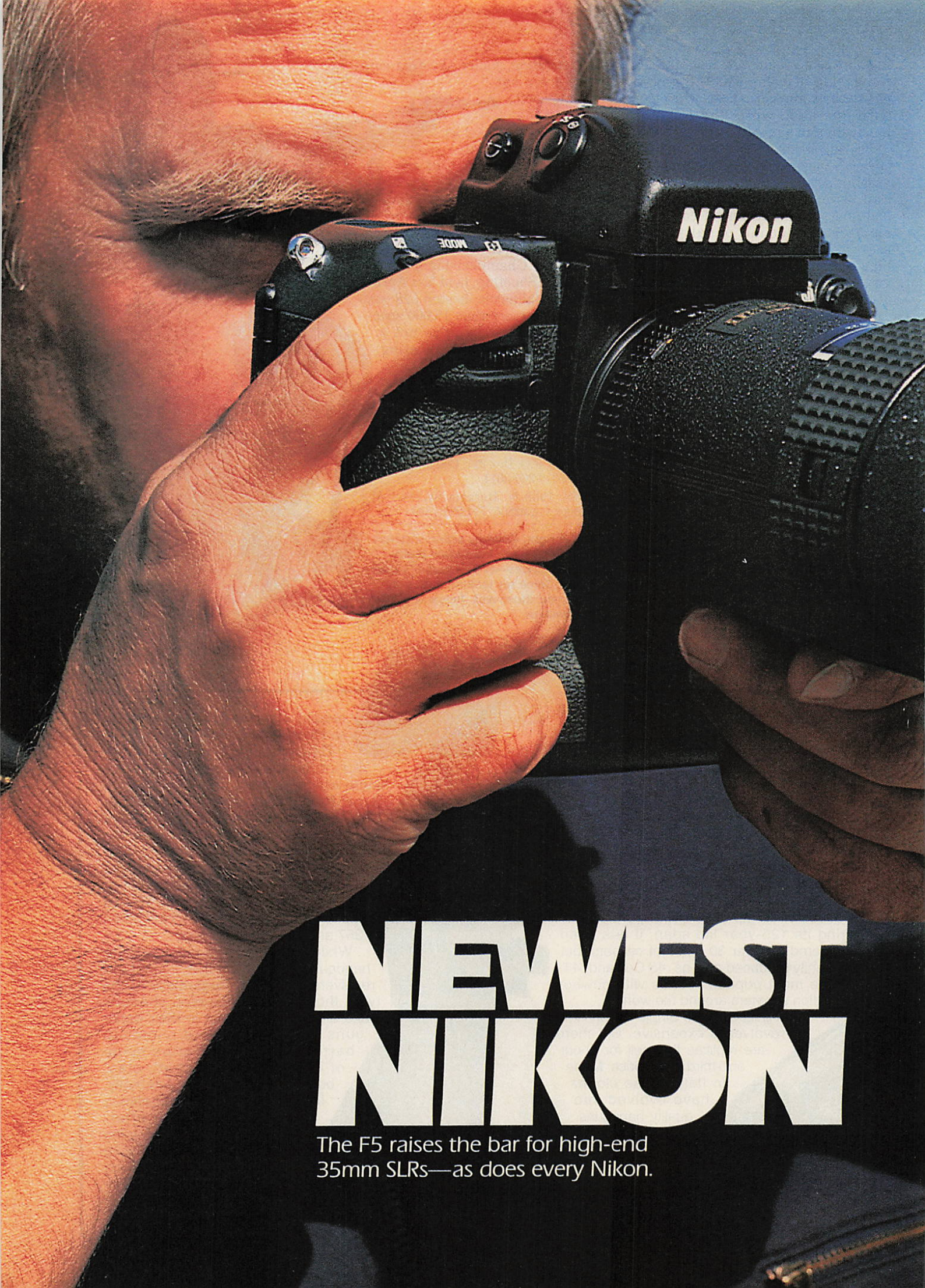
Six Shooters

● When it comes to handguns, the king of cowboy action shooting is Colt's Single Action Army revolver—a.k.a. The Peacemaker. In fact, SASS has a deal with Colt that allows members to order Peacemakers with their SASS membership number as the gun's serial number. Famous for its appearance in the hands of dozens of celluloid gunslingers, the gun has undergone only minor changes since its 1873 introduction as the U.S. Cavalry's side arm. During its 125-year life span, it has been chambered for over 30 different calibers, but is currently produced only as .45 Colt and .44-40—the most popular rounds with cowboy action shooters around the world.

At $1200, Colt's Single Action Army revolver is expensive. But there are replicas that sell for about one-third of the price. Made in Italy, these clones have evolved into quality handguns in their own right, and some require a knowledgeable person to sort them from actual Colts.

Other than the Colt and its many clones, cowboy shooters look to the single-action Vaquero, made by Sturm, Ruger & Co. At first glance, Vaqueros resemble Peacemakers, but they have a larger frame and a modernized action that prevents the gun from firing accidentally if it's dropped when a loaded chamber is under the hammer. For $400, the Vaquero offers both .45 Colt and .44-40 calibers, plus more modern .357 and .44 Magnum rounds.

While these are the most popular handguns, there are other frontier-era revolvers out there. Regardless of the type, though, cowboy action shooters take a personal interest in their handguns. Many guns have engraved barrels and custom grips made of ivory, mother of pearl, stag, bone or exotic woods. Internally, factory springs are sometimes replaced with lighter aftermarket ones, and all mating surfaces are honed to a glass-smooth finish. Such alterations make it easier to cock the hammer and shoot fast.


Nikon
NEWEST
NIKON
The F5 raises the bar for high-end
35mm SLRs—as does every Nikon.

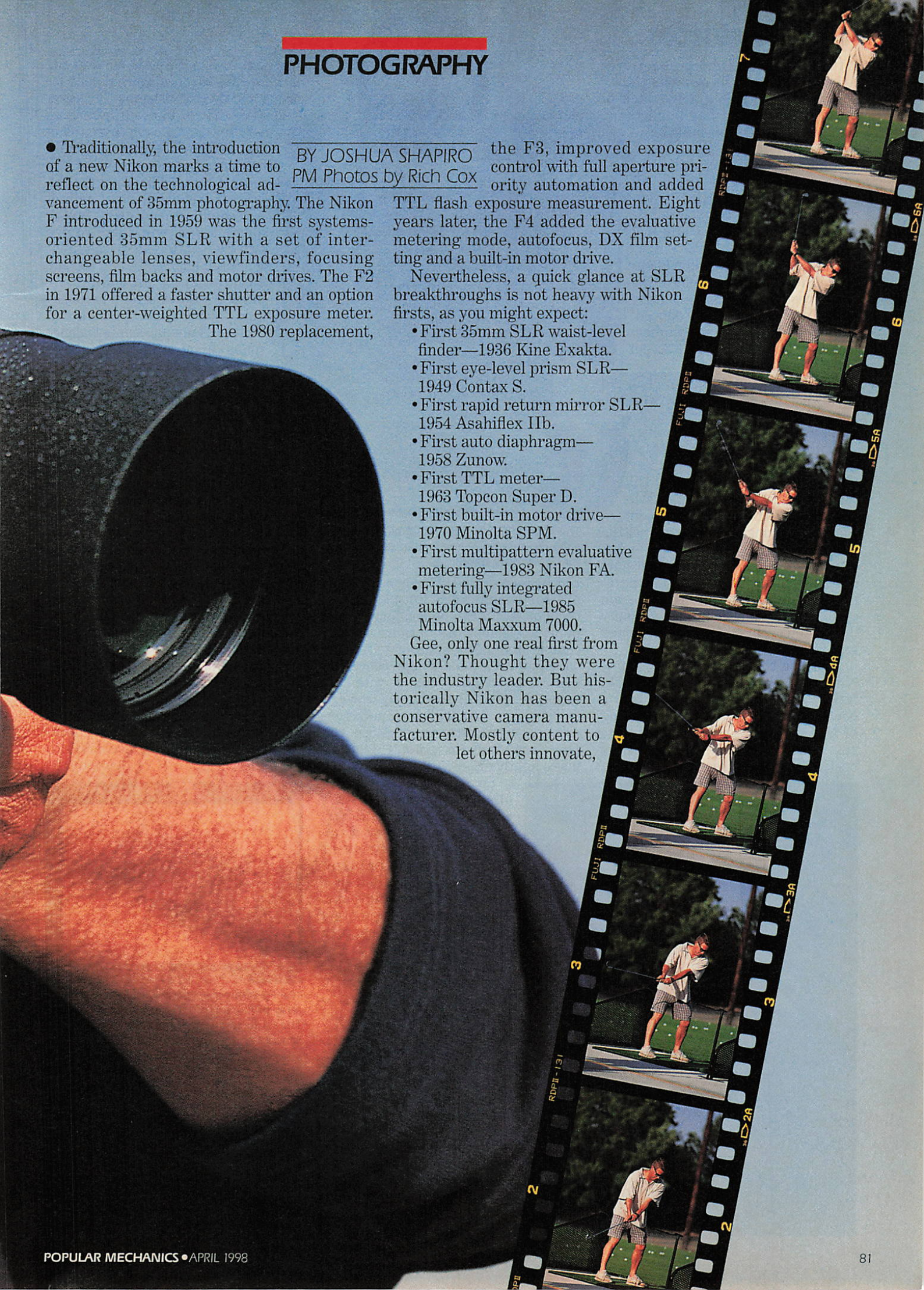
BY JOSHUA SHAPIRO
PM Photos by Rich Cox

● Traditionally, the introduction of a new Nikon marks a time to reflect on the technological advancement of 35mm photography. The Nikon F introduced in 1959 was the first systems-oriented 35mm SLR with a set of interchangeable lenses, viewfinders, focusing screens, film backs and motor drives. The F2 in 1971 offered a faster shutter and an option for a center-weighted TTL exposure meter. The 1980 replacement, the F3, improved exposure control with full aperture priority automation and added TTL flash exposure measurement. Eight years later, the F4 added the evaluative metering mode, autofocus, DX film setting and a built-in motor drive.

Nevertheless, a quick glance at SLR breakthroughs is not heavy with Nikon firsts, as you might expect:

- First 35mm SLR waist-level finder—1936 Kine Exakta.
- First eye-level prism SLR—1949 Contax S.
- First rapid return mirror SLR—1954 Asahiflex IIb.
- First auto diaphragm—1958 Zunow.
- First TTL meter—1963 Topcon Super D.
- First built-in motor drive—1970 Minolta SPM.
- First multipattern evaluative metering—1983 Nikon FA.
- First fully integrated autofocus SLR—1985 Minolta Maxxum 7000.

Gee, only one real first from Nikon? Thought they were the industry leader. But historically Nikon has been a conservative camera manufacturer. Mostly content to let others innovate,



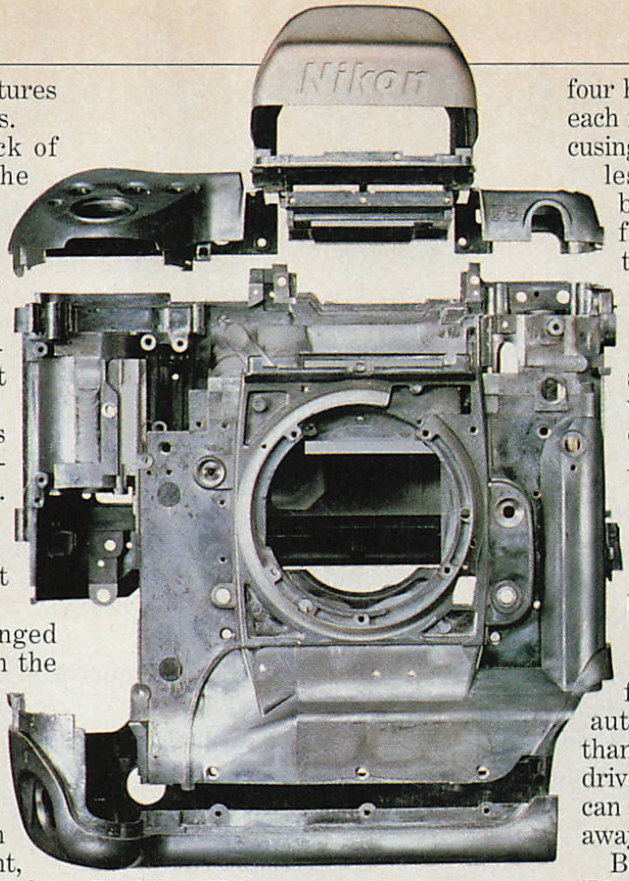
it then selects and improves features to incorporate into its own models.

But despite this glaring lack of innovation, Nikon has been the camera of choice for the working professional photographer. Nikons are built rock-solid to take the wear and abuse of constant fieldwork. Nikon coddles professionals with seminars, loaner equipment and fast repair service.

Most importantly, Nikon keeps the faith with those who have sizable investments in Nikon lenses. Since the F was first introduced 39 years ago, all Nikon bodies have had lens mounts that accept older F-series lenses.

The pro/Nikon equation changed somewhat in the late 1980s with the advent of the new generation of autofocus (AF) SLRs. Minolta introduced the AF concept. Canon followed with a new series of autofocus lenses with built-in coreless motors. With faster focusing and lighter weight, Canon's offerings began to attract the attention of serious professionals. Major promotional dollars didn't hurt either. In particular, sports photographers found the speed of the Canon system important. Their high visibility during the events they covered helped give Canon credibility.

Against this backdrop, the new Nikon F5 is both the newest model in Nikon's professional lineup and a powerful response to Canon's wooing of Nikon loyalists. It is clearly the best Nikon ever made and maybe the best SLR ever to reach the market.



The Nikon F5 features a solid aluminum-alloy die-cast body and a titanium casing for heavy-duty handling.

But be forewarned. This is not a camera for casual vacation use. Even though the F5 can be configured as a point-and-shoot, its options are too complicated and numerous to master with just occasional usage. Since the body alone weighs 3 pounds with batteries, it is not carried lightly or without purpose. And with a manufacturer's suggested list price of $3550, the purchase of an F5 is not a decision made lightly either.

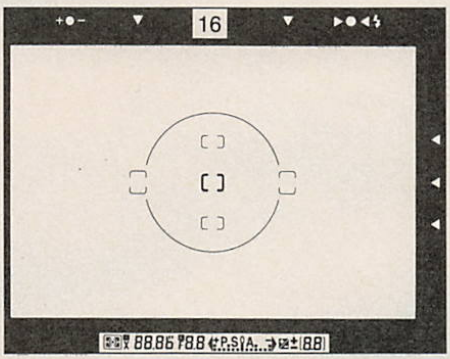
Nikon's flagship F5 professional autofocus SLR camera.

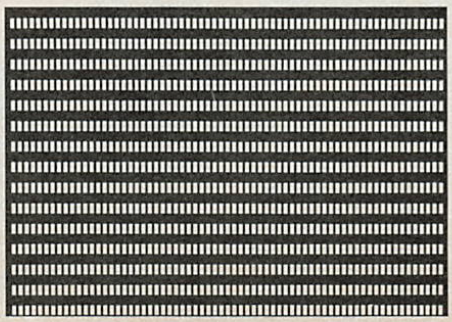
So, why does an F5 cost almost four grand? Start with a gorgeous, tank-like, well-designed camera structure made entirely out of rigid die-cast aluminum. The body is sheathed in a rubberized coating that, along with the ergonomic shape, makes the camera easy to grip. Displays are large, lit and easy to read. Controls are easy to reach, have safety interlocks to prevent accidental use, and are assignable using the camera's customizing options. The F5 body even has a separate autofocus control and shutter release for taking vertical format pictures. All settings are made by holding a button while turning a dial.

After rugged heft, all-out speed is the F5's most formidable attribute. The camera's speed is supported by four high-torque, coreless motors, one each for film advance, rewind, lens focusing and shutter charging. The careless or driven photographer can burn through a 36-exposure roll of film in a mere 4½ seconds and then turn around and rewind it in only 4 more. That's on-the-job speed. One-eight-thousandth of a second is the fastest shutter speed. Flash will synchronize with the shutter at speeds up to one-three-hundredth of a second. An internal circuit continually monitors the shutter's accuracy and sounds an alarm in case of failure. A unique counterbalance mechanism minimizes mirror bounce and vibration.

Yet even this raw speed is less important than the rate of autofocus that supports it. The F5 autofocusing system works faster than the 8-frames-per-second motor drive and, paired with a 300mm lens, can track a subject as close as 66 ft. away moving at 200 mph!

Besides record-setting speed, the F5 autofocus has a number of innovative modes and features. The F5 can focus from one of five spot sensors in the viewfinder—center, left, right, up and down. The spot is selected by a thumb switch on the back of the camera. The cross-positioned sensors allow fast focusing in vertical format, and with subjects that have only dominant horizontal features. The system is sensitive enough to focus with all lenses that have an aperture of f/5.6 or faster (i.e., all Nikon AF lenses) and in extended light conditions from ultrabright EV 19 down to the





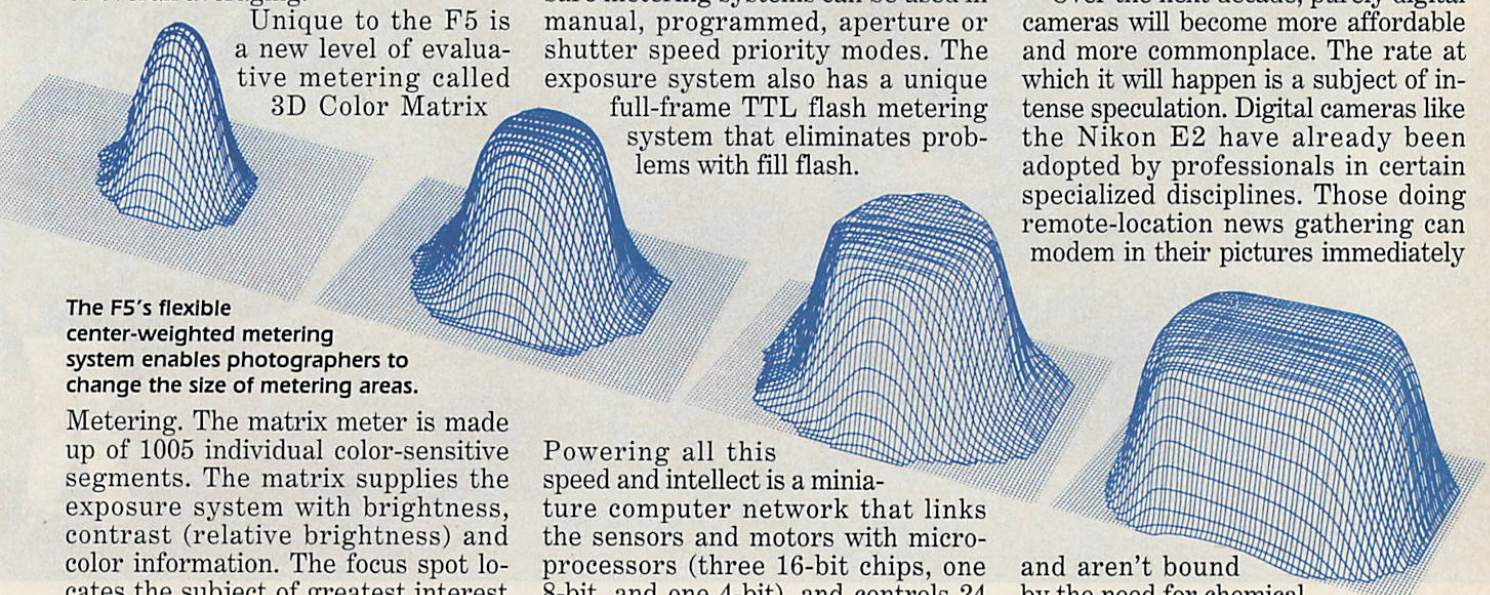
The F5 offers autofocus with a crosstype array of fine focus detection sensors (above). The multi-segment light meter offers 1005 sensors and Nikon software (below).

dimmest EV-1 using ISO 100 film.

With the F5, you can disable the AF system and focus manually with an electronic rangefinder assist in the viewfinder, or set AF in one of two priorities. In single servo autofocus mode, focus has priority. The shutter will not release until the lens is focused. This mode is traditionally used to lock focus on a subject and recompose. However, with the multiple focus sensors, this mode is less significant. With continuous servo autofocus, though shutter release has priority the AF system is fast enough to focus before the motor drive can advance. Nikon's AF has a unique lock-on feature that holds focus even when subjects are momentarily blocked. In addition, the F5 adds a dynamic AF mode that works either with shutter or focus priority focus. With dynamic AF, you can use one of the spot sensors to focus on a moving subject, and the other sensors will follow the subject as it moves across the frame.

Each of the five focusing spots can also be set to support 1.5% (of image area) 4mm spot metering. Alternately, the F5 supports flexible 75/25% center-weighted metering. The spot size, normally a 12mm circle, can be varied to three other diameters or overall averaging.

Unique to the F5 is a new level of evaluative metering called 3D Color Matrix Metering. The matrix meter is made up of 1005 individual color-sensitive segments. The matrix supplies the exposure system with brightness, contrast (relative brightness) and color information. The focus spot locates the subject of greatest interest within the frame, and Nikon D-series lenses supply distance information. These inputs are processed against a stored database abstracting the exposure characteristics of 30,000 scenes. For example, a band of blue above a band of green with an extremely bright area in the blue portion will be recognized as a landscape and exposed accordingly. This system can even detect the presence of fluorescent illumination and is particularly useful in correctly exposing such difficult compositions as backlit subjects. Any of these three exposure metering systems can be used in manual, programmed, aperture or shutter speed priority modes. The exposure system also has a unique full-frame TTL flash metering system that eliminates problems with fill flash.



The F5's flexible center-weighted metering system enables photographers to change the size of metering areas.

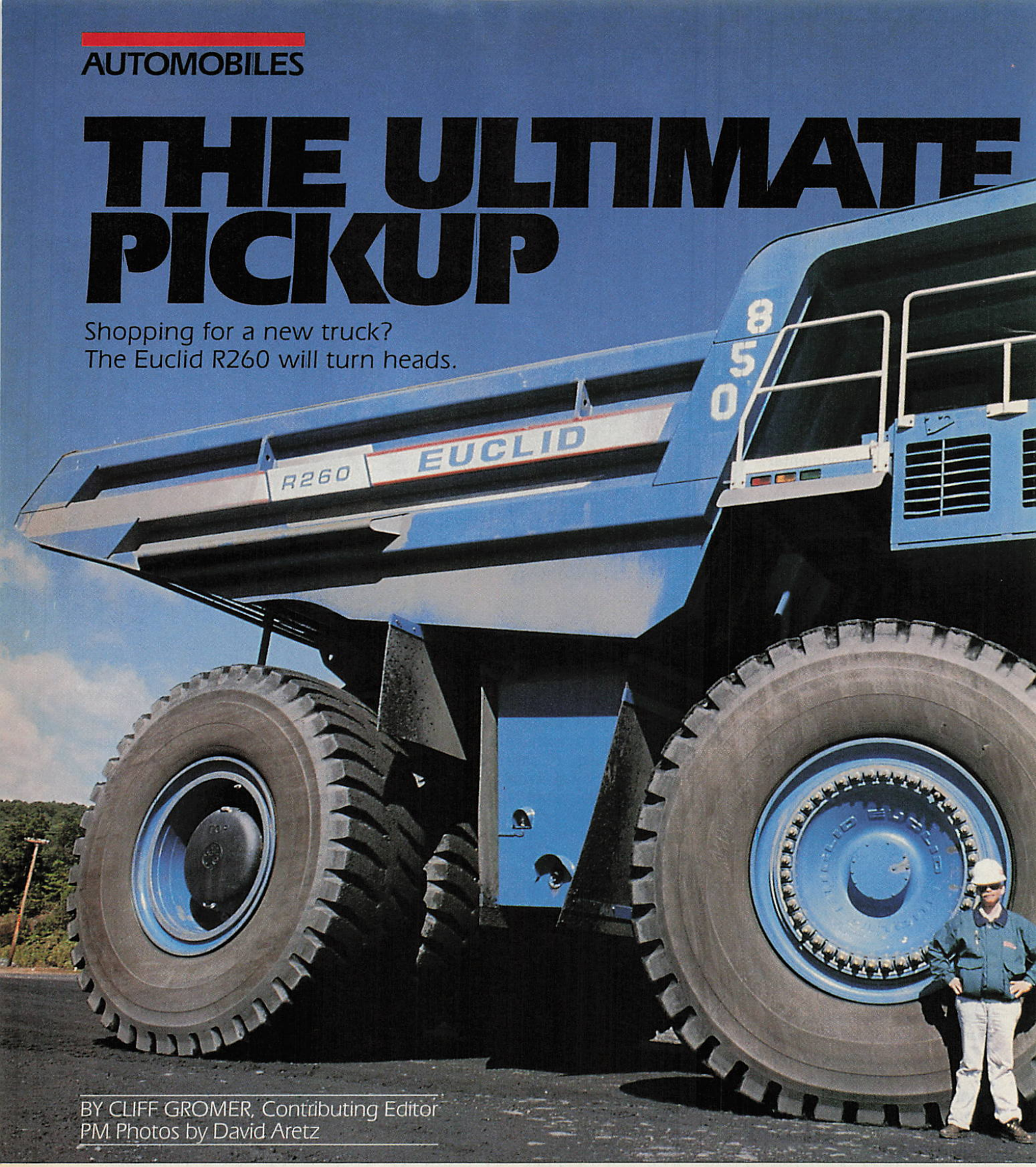
Powering all this speed and intellect is a miniature computer network that links the sensors and motors with microprocessors (three 16-bit chips, one 8-bit, and one 4-bit), and controls 24 areas of customization. The network can even be linked to a PC running Windows 95 or a Macintosh to program additional options.

Is the Nikon F5 the ultimate analog camera? It could be, but it's still too soon to tell. Much depends on whether an analog F6 will appear within the next eight to 10 years, or whether Nikon will switch entirely to digital technology. And that, in turn, depends on whether new digital film systems are accepted by professionals.

Over the next decade, purely digital cameras will become more affordable and more commonplace. The rate at which it will happen is a subject of intense speculation. Digital cameras like the Nikon E2 have already been adopted by professionals in certain specialized disciplines. Those doing remote-location news gathering can modem in their pictures immediately and aren't bound by the need for chemical processing facilities. Those doing extensive catalog photography use digital today because their images integrate more easily with the digital technology used in publishing. The growing prominence of the Internet might drive more professionals to go digital. In the meantime, professionals have a wonderful new analog tool—the Nikon F5— that may become the next must-have big thing. **PM**

THE ULTIMATE PICKUP

Shopping for a new truck? The Euclid R260 will turn heads.



BY CLIFF GROMER, Contributing Editor
PM Photos by David Aretz

● While Ford, Chevy and Dodge pickups are slugging it out in the door wars, the height wars, the horsepower wars and the who-looks-tougher wars, a new kid on the block has quietly entered the pickup truck fray. It's the Euclid R260, and it can literally roll over and crush the competition.

This is one truck that will get attention just sitting in your driveway. Your neighbors will turn green with envy, or just simply green, especially when you take delivery of your new Euclid. When your neighbor buys a new Ford F-150, Chevrolet C/K or Dodge Ram, he's got to travel down to the dealership to pick it up. But Euclid delivers. Your new R260 arrives factory fresh, direct from Guelph, Ontario, loaded aboard five tractor trailers. All you need are the cranes to unload it, material handling equipment to move the parts around, and a crew of four to bolt and weld it all together—all in less than two weeks time. Okay, so a few lawns might get torn up in the process, and maybe some roads in your neighborhood might get closed off for a while. But who

While we couldn't smoke the tires, the big Euc screamed to a top speed of 25 mph in 14.08 seconds empty, and 20 mph in 28.29 seconds fully loaded. We won't talk about the slalom.

else gets to see his truck assembled before his very eyes? And it makes for one heck of a home video.

Once everything is together, you'll want to invite the neighbors over for a truck-warming party. Forget about those wimpy tailgate parties. The spacious party deck (Fords and Chevys don't come with a party deck—not even as an option) is standard equipment and will accommodate scores of partygoers. And you'll make an even bigger hit giving rides in the Euclid's 3-stage, double acting hoist dump bed with patented cushioned retraction for a soft landing.

You'll want to use the occasion to show off the Euclid's other great features, too. After all, what's the point of owning the world's biggest truck if you can't brag a little now and then? Start off with the engine. It's Detroit Diesel's new top-of-the-line S-4000 turbodiesel. This spunky V16 blows away GM's puny Vortec V8 and Ford and Dodge's wimpy V10 engines with more than six times the horsepower—a robust 2500 ponies at 1900 rpm. A General Electric GTA 26F 220-amp alternator mounted directly on the rear of the engine supplies power to the two General Electric 750v-DC 787FS wheel motors that come with a 31.875:1 planetary gear reduction. There's one motor mounted in each rear wheel. Flat out, this baby will hit over 30 mph, and maybe even twice that if you lose control on a grade.

Not to worry. A 7-step retarder system does a super job of controlling speed to a preset level, making those downhill dives virtually a thing of the past. Come off the gas, er, electric, and the wheel motors become DC

THE ULTIMATE PICKUP

Cab offers great visibility. Controls and response are surprisingly conventional.

generators throwing current into an 18-element resistor grid package. The system converts power into heat, which is dissipated by dual blowers driven by an electric motor.

Don't forget to point out all the standard comfort and convenience features that $1.8 million (give or take, depending on the trade-in allowance for your old pickup) will buy. It's all there—air conditioning, 6-position air suspension seat, cigar lighter, roll-down windows and rubber floor mat. A loud stereo is optional, but an elevator to take you up to the cab is not available.

With an 850,800-pound GVW, substantially more than its lesser rivals even when they're equipped with optional towing packages, it's comforting to know you've got some decent brakes under you. Each independent front axle uses dual 48-in. discs with three calipers per disc for a total brake surface of 2640 in. per axle.

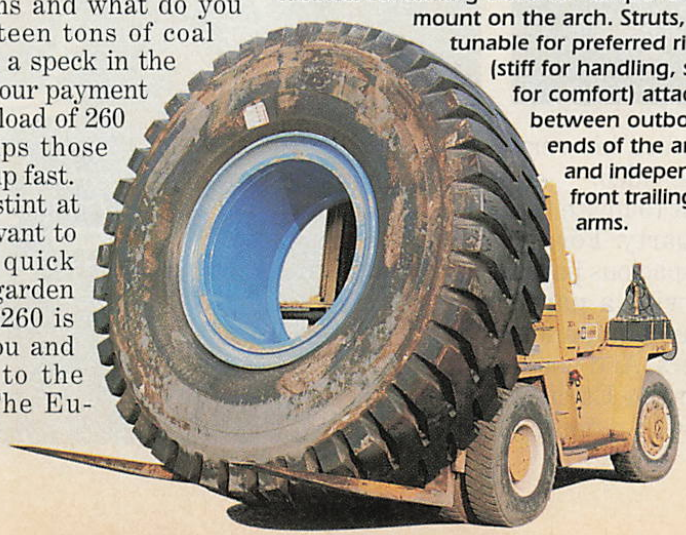
Versatility is one reason the two best-selling vehicles in the United States are pickup trucks. But the Euclid gives new meaning to the word. It's right at home handling everything from a milk run (from a quart to the entire cow, or maybe a small herd) to a side job hauling anthracite at the local mine. Try doing that with your Ram 1500. And forget about that "You load 16 tons and what do you get?" stuff. Sixteen tons of coal won't even make a speck in the pickup bed—or your payment book. With a payload of 260 tons, Euclid helps those greenbacks pile up fast.

After a day's stint at the mine, you'll want to relax a bit. A quick squirt with the garden hose, and the R260 is ready to haul you and the wife down to the country club. The Euclid's dual spiral stairways make for some really grand entrances at outdoor functions, and you can even service the air filters on the way down. Car jockeys at the club will never lose your truck in a sea of lookalike Caddies, Lincoln Town Cars and Lexus sport/utilities.

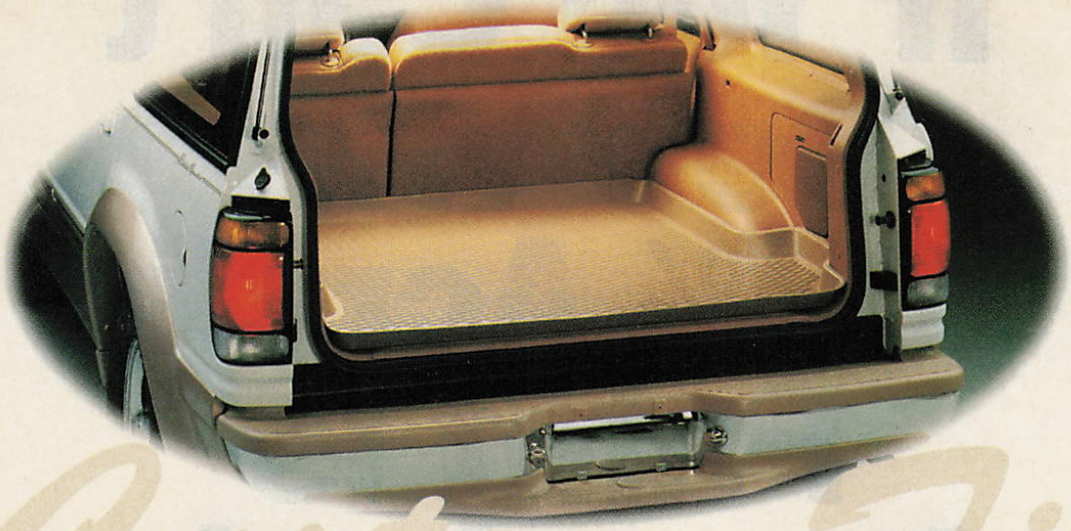
So what's it like to drive this pickup? Well, if you can dock the Staten Island Ferry, or drive a 2-story house, the R260 is a piece of cake. Actually, the controls are very conventional in response and feel. You quickly acclimate to the height and breadth of the truck. Slap the console shifter into Forward or Reverse and you're off—toll plazas and overpasses notwithstanding. Pull into your local gas station, have the attendant check the air, fill up the 1000-gal. tank, and you can run all day on a fuel-sipping 33-43 gal. per hour.

Remember, you may look fine in a Ford, dandy in a Dodge and cool in a Chevy, but you're looked up to in a Euclid. Way up. **PM**

Some assembly required. Your Euclid R260 arrives aboard a fleet of semis. A forklift (not included) is a handy item for moving the six 12-ft.-high tires. Use your crane to lift the high arch (captain's bridge) and then bolt it to the main chassis. The cab, decking and cabinets containing electrical components mount on the arch. Struts, tunable for preferred ride (stiff for handling, soft for comfort) attach between outboard ends of the arch and independent front trailing arms.



KEEP YOUR VEHICLE LOOKING NEW.



Custom Fit

Black Armor Cargo Trays keep your cargo space in mint condition. The 2" lip keeps large spills in the tray and off of your expensive interior ... so that even a tipped paint can is no problem. Every Life-Time Warranteed Tray is made of a heavy-duty, no-skid, co-polymer that's unaffected by gas, oil, mud, road salt, or extreme temperatures.

And because our Cargo Trays are custom-molded to the exact dimensions of your Sport Utility Vehicle or Van, they look sharp.

Black Armor Floor Guards do the same for your front & rear passenger areas. Custom-molded for most Pick-Ups and Sport-Utility Vehicles, they shield your carpet from road salt, mud, and slush with the greatest coverage of any floor mat on the market. They look great, remove easily for cleaning, and protect your investment.

Easy on your wallet. Floor Guard and Cargo Tray prices range from $59.99 to $89.99, a small price to pay for a new-looking vehicle!

Available in these colors:

TAN BLACK GREY

For ordering information or the location of your nearest Black Armor dealer, call

1-800-234-6992

Or visit our web site at http://www.black-armor.com

BLACK ARMOR™

*Some restrictions apply, see manufacturer for details. Black Armor is a registered trademark of Highland Group Industries.

If You Can't See Why 100% Acrylic Paint Is Important, Maybe In A Few Years You Will.

Behr Premium Plus Exterior Paint with a 15-year warranty is made with 100% acrylic. Most paints are made with a lot less. And while it may be hard to tell the difference now, in a few years it will become painfully obvious. Behr Premium Plus, only from The Home Depot. The premium paint with a Home Depot price.

© 1998, HOMER TLC, Inc.

SPECIAL SECTION

Gardening Guide

- Growing Flowers
- Gardener's Bookshelf
- Planting Mature Trees
- Container Gardening
- Proper Soil Prep
- Gardening By Mail

And much more!

PM PHOTOS BY WESTLIGHT, RALPH A. CLEVENGER, WESTLIGHT/APL

GARDENING GUIDE

Why Garden?

You've got a lot pulling at your time already—which may be the best reason to start cultivating your green thumb.

BY STEVEN WILLSON, Home Improvement Editor

If you like watching baseball, road races and old movies when the weather is good, then gardening may not be for you. There's no question that it's time-consuming, frequently tedious, occasionally rigorous and all too often frustrating. And if you are looking for vegetables that are cheaper than what you can buy or flowers that are as flawless as your florist delivers, then maybe it's a good idea to stay on the couch—where the livin' is easy and the remote is close at hand.

Not only is gardening more physically demanding than many of us would like, it also requires more patience and diplomacy than most of us want in our avocational pursuits. Unless you feel comfortable with a limited nuclear strike, the blights and pests that can invade your own patch of paradise can quickly usher you past distraction and into that special world occupied only by the screams of a newborn.

It doesn't sound like much fun, does it? But it is, because gardening has so many compensating pleasures. The first, plainly put, is that it's worthwhile. What better way to spend some spare time than growing good food for your family or landscaping around your home to reflect the expanse of your imagination instead of the limits of conformity?

Second, gardening is not a passive activity, there's no "virtual" anything about it. You can't dream the slugs away with a joystick and no microchip can force you to turn over the compost pile when your back is aching and your shoulder is stiff. You turn it over because you want to turn it over, in spite of everything else.

Third, gardening can be a compelling cooperative activity. Your best harvest may be the pleasure you get from working with family and friends. There's never a shortage of things to do, no limit to the lessons that can be learned—especially for children—and there's always plenty of credit to go around, even for the mistakes.

But it can also be, and very often is, a more solitary calling. And as such, it's one of the purest antidotes to the demands of our busy, supposedly post-industrial lives. The folks at work may reward you best for being a card-carrying team player and the folks at home may love you the most when you are completely occupied with them, body and soul.

But somewhere there really should be something just for you, on your own terms. Maybe it is on the couch. But maybe it's out there too, coming to terms with all sorts of living things that were so much a part of people's lives not that long ago. You won't need any meetings. No power posturing is required. And the commute is a breeze—just walk out the back door. PM

PM PHOTO BY MERLE HENKENIUS

GARDENING GUIDE

Growing Flowers

The palette is almost endless, from the most briefly blooming annual to the hardiest perennial. What a great way to paint around the house.

BY MERLE HENKENIUS

Nothing dresses up a home's exterior like a few well-placed and well-designed flower beds. Flowers can make any home more inviting. The splash of color and the sweep of texture these living things bring to a yard also speak to the vitality and optimism of the occupants. While flower gardening is not difficult and can be learned as you go, there are a few things to consider before you begin. Let's start with the most basic factors: how to choose flowers, where to plant them, how to plant them, and how to keep them thriving.

Annuals or perennials?

As the name implies, annuals are flowers that die off with the first cold snap. They may re-seed themselves, but this year's plants won't be around next spring. As with most short-lived things, they are flashier than those that can take their own sweet time. They offer vibrant, season-long colors—to better attract pollinators—and because they're in such a hurry, they're fairly easy to grow. As seeds and seedlings, they're also affordable.

Perennials are another matter. In general terms, a perennial is any plant—including trees, shrubs, turf grasses and "herbaceous" flowers—that lives at least three years, though most live a good deal longer. In colder climes, the perennial loses its top growth with the first hard freeze, but its root system stores enough energy for a full recovery the following spring.

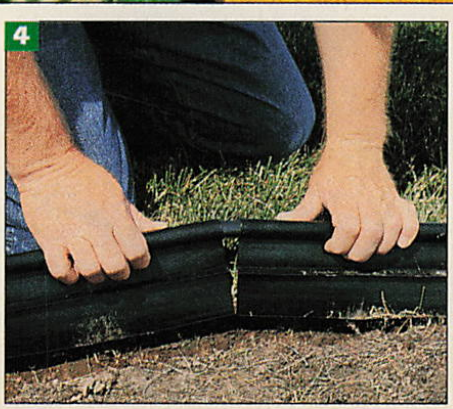
With some exceptions, perennial colors are softer, more muted. Perennials almost always bloom for shorter periods of time than annuals, with a few blooming in spring and the rest in summer or fall. Re-

Lead photo: Westlight/O'Brien Production
Step-by-step photos: Merle Henkenius

Use a garden hose to lay out the bed area, then cut the sod along the hose with a square-nose shovel or spade.

Slice the sod into strips and peel it back. With well-established sod, undercut with a spade as you go.

To install a plastic border, cut a line in the soil and feed the border into the cut. Press it down with a spade.



Where two lengths of border meet, insert a splice tube into the end of each and push the lengths together.

Enrich the soil by spreading organic amendments, like peat moss, cow manure and compost, on the surface.

Use a power tiller to work the organic amendments deep into the soil. Try to end up with 6 to 8 in. of fluffy soil.

lieved of the urgency of a short life, perennials can invest in more interesting structures and profiles. In design terms, they offer greater textural interest.

While perennials cost more up front, they don't usually require much additional expense. Plant them once and you won't have to replant for years. There is also a wider variety of perennials to choose from, with something for every climate and taste. And because perennials need only a rise in soil temperature to spring to life, they enjoy a practical head start on annuals, which require, beyond a warming soil, the efforts of the planter.

Considering what each has to offer, many homeowners choose a combination, planting the bulk of their garden in low-maintenance perennials, with a few brightly colored annuals serving as accents. This is the option we've chosen here. While starting off with lots of perennials is a more costly approach, you could easily spread the expense over several years by starting with more annuals and gradually replacing them with perennials.

Plant and site selection

While there are literally hundreds of choices when it comes to annual and perennial flowers, geography, regional climate and site conditions are limiting factors. For example, a flower garden in Tucson will be different than a garden in Charleston, and the Charleston garden will differ from one in Bozeman. An open, sunny lot will require different plant and design choices than a smaller, wooded space. Similarly, a formal English-style garden will dictate plants that are less invasive than those suited to an informal garden.

Still, choosing plants that will work for you need not be overwhelming. You probably already know the look you're after, based on neighborhood examples, and a few design guidelines can help fill in the blanks. For more specific information, visit your local garden center or nursery. These suppliers can provide practical advice on locally favorable plants, and many offer design help from certified designers. Often the design fee is waived when you spend a given amount on plants and garden supplies. Your county's USDA Cooperative Extension office is another good source of information.

When it comes to choosing the best bed sites, look for fairly level, well-drained spaces away from rough traffic. The space next to a sidewalk is fine, for example, but the space behind a basketball hoop is probably not. Wind is another qualifier. Taller, more vulnerable plants are better suited to the leeward sides of fences and houses. And because there are more flowers that thrive in sunlight than shade, a space with at least some sun will expand your options.

As for soil conditions, unless you have exceptionally loamy soil, plan to improve it before planting. The goal is to create a fluffy, absorbent soil at least 8 in. deep, usually by tilling in compost, dried manure and peat moss. These materials keep the soil from becoming so dense and compact that it stifles root development and sheds water.

Design considerations

Flower gardens take two forms: They're either borders or beds. Those out in the open, with exposure on all sides, are called beds. Those that skirt buildings or other landscape features are called borders.

Because beds can be viewed from several angles, it makes sense to plan them with the tallest plants near the center, with successively shorter plants extending toward the perimeter. Borders, on the other hand, are usually viewed head-on, so the taller plants should serve as a backdrop for shorter, more colorful varieties. Many designers suggest that borders should be twice as wide as the height of the tallest plants. And where a border wraps around a corner, plants that are heavier in appearance can

With the layout complete, dig the hole for each plant, using the pot size to determine the hole's width and depth.

Clean out the hole and soak the bottom and sides liberally with a mixture of water and fertilizer.

Before setting the plant in the hole, pull some roots outward, away from the ball, to encourage lateral root growth.

Set the plant in the hole so the top of the potting soil is even with the grade. Mound and press fresh soil around it.

Once the plant is in the ground, pour a mix of water and fertilizer over it. Then flood the soil with plain water.

Small plants, like this annual Vinca, need only a slight depression in the soil. Mound fresh soil around its base.

(Please turn to page 96)

© 1997 Sears, Roebuck and Co.

INTRODUCING 18 VOLTS OF PURE ADRENALINE. HANG ON TIGHT.

This is the drill that will give you a boost. Check out the new 18-volt cordless from Craftsman. Our most powerful cordless ever. Capable of driving through brick and concrete. Fully equipped with 345 lbs. per inch of torque, a two-speed gearbox, a 24-position clutch, 1400 RPMs and two rechargeable batteries. It's a drill you're gonna want to hold on to. And it's available only from Sears.

CRAFTSMAN

MAKES ANYTHING POSSIBLE

www.sears.com/craftsman

 (Continued from page 94)

help soften a home's hard edges.

Flower gardens can be formal or informal. Formal gardens are generally composed of adjoining or overlapping geometric shapes—squares, circles, triangles and rectangles—and are usually divided or bordered by straight footpaths. The formal garden should have an orderly feel, with a sense of compensating balance, all achieved through shape, color and repetition.

Because of their geometric underpinnings, formal gardens are fairly easy to design and implement for the beginning gardener. Just lay out the patterns on graph paper, paying particular attention to balancing—repeating—prominent features, and scale the whole thing to size. Then choose plants that will fit each space. Most formal gardens include annuals and perennials, anchored by a few ornamental trees and shrubs that lend themselves to topiary shaping.

Because formal gardens are contained, the plants you choose should mature in predictable shapes and sizes. Avoid sprawling plants and those that invade adjoining spaces through root propagation or surface runners. Perennials that need regular pruning should also be avoided.

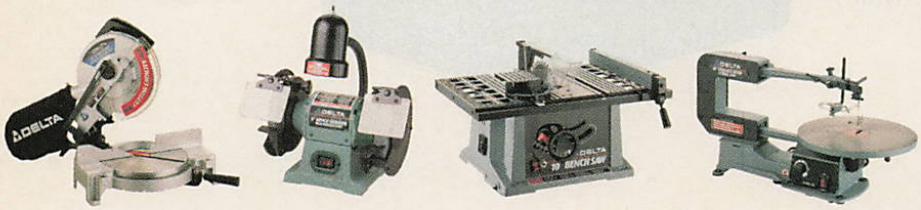
Tools that can get you out of the doghouse, keep you out of the doghouse, or build the doghouse.

There's an age old secret to successfully doing it yourself. The secret is having the right tool for the job. All of a sudden you find yourself tackling projects you used to pay someone else to do.

Once you've cut a perfectly straight edge or a gentle curve, you'll be wanting to drill a perfect hole or sand a perfect circle or grind a perfect edge. And right then and there, you'll understand why so many professionals own Delta. For the name of your nearest Delta dealer, call Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

THE POWER OF THE PROS

DELTA WOODWORKING MACHINERY
A Pentair Company



www.deltawoodworking.com

Proud sponsor of *The New Yankee Workshop.*

Informal gardens are a bit harder to design because they're inherently less orderly. Instead of following geometric patterns, they creep and meander in irregular forms. Instead of choosing flowers that exaggerate or echo geometric shapes, you'll be aiming for a more varied, random—almost wild—appearance. Of course, the problem with randomness is that it comes so close to chaos. To hold the line, choose plants with varied structures, colors and different bloom times, to play off one another, and avoid planting in rows or repeated patterns. Instead, plant some in drifts—tightly grouped sets of similar flowers—again with a random, irregular placement.

Here, too, it makes sense to use the

When planting near a building, note the probable mature diameter of plant and keep it at least half that distance away from wall.

After planting, spread mulch over the bed to improve its appearance and reduce soil-moisture evaporation.

To encourage root growth, it's a good idea to pinch back the uppermost blooms from newly planted flowers.

taller plants as backdrops, either bordering a wall or anchoring the center of a bed. In an oblong or kidney-shaped bed, like the one we planted, it also helps to weight the taller, centerline plants slightly nearer one end. Then, anchor the opposite end with brightly colored annuals.

One plan in action

We chose to finish two areas in flowers, one a small, shady border and the other a larger, full-sun bed. Our 5 × 10-ft. border skirts the north side of the house and the larger, kidney-shaped bed curves toward a concrete driveway. This sweeping, informal bed, measuring about 11 × 33 ft., serves as a visual counterbalance to the drive, which weights the property heavily to the left. We trimmed each bed with plastic edging and tilled compost into the heavy clay soil. We spent about $500 and took advantage of some design help that was included in the bargain. In any case, this is a job that just about anyone can do.

Begin by laying out garden hose in the rough shape of the bed space. Then move the hose around until you have a shape the fits the yard and suits you. When you have the bed laid out, use a garden spade or a square-nosed shovel to slice into the sod next to the garden hose (Photo 1). To remove the sod, slice it into strips and cut under it with the spade. Then just peel it back (Photo 2).

With the bed area cleared, use the spade to cut a line around the perimeter approximately 6 in. deep. Feed the plastic border into the opening and, pressing the spade against the border's bottom ridge, push it into the ground. Stop when the top tube of border rests just above the exposed soil (Photo 3). Where two lengths of border meet, push them together over the splice tube included with the kit (Photo 4). If you have trouble inserting the tube, lubricate it with liquid dish soap.

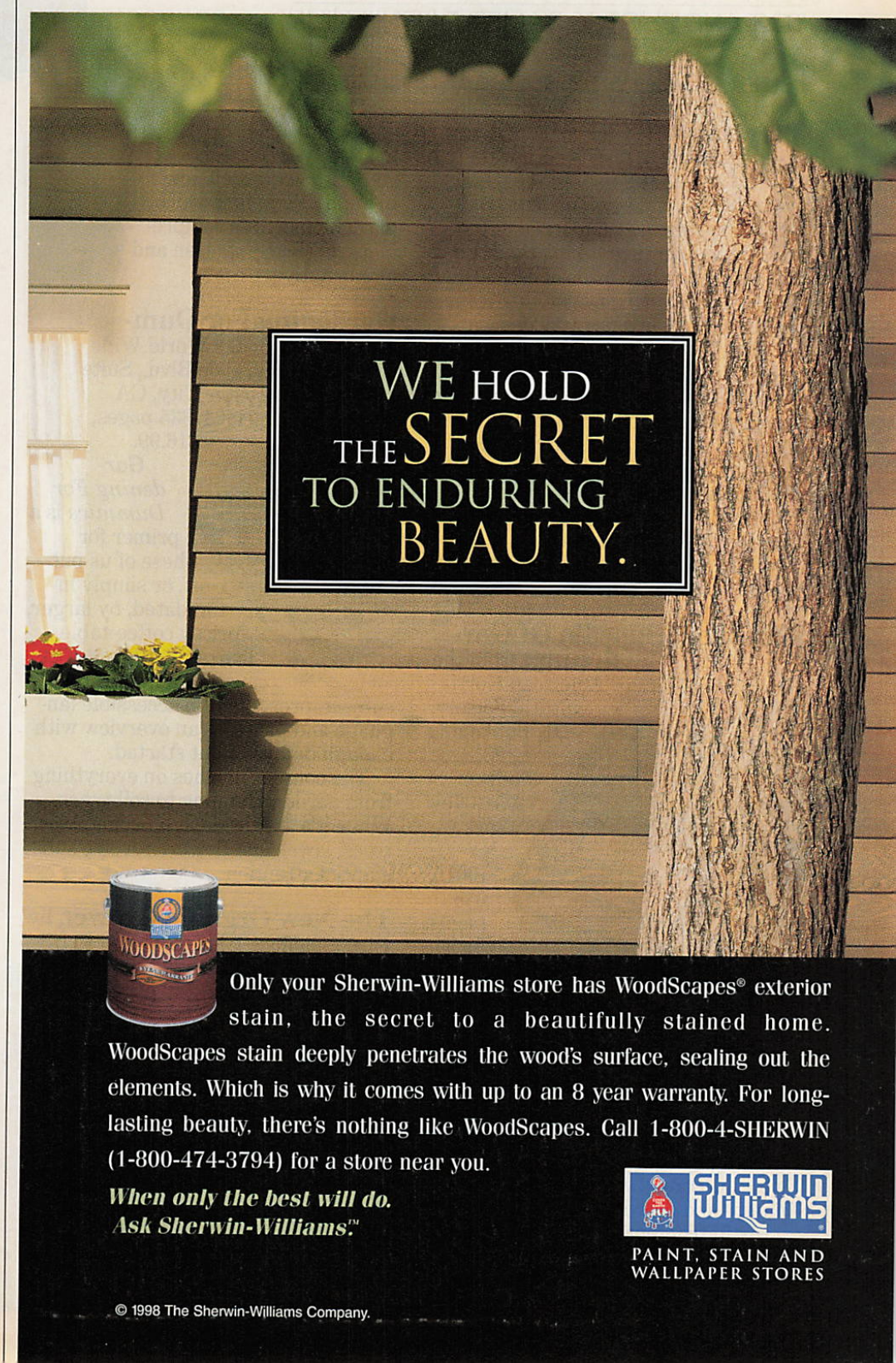
To condition the soil, we chose a combination of compost, free from our city landfill, plus a sprinkling of peat moss. Just cover the bed several inches deep in compost and peat moss (Photo 5), and till it in to a depth of about 8 in. (Photo 6).

With the bed prepared, set out your plants in their starting pots and move them around until you find the look you're after. Then, dig a hole for the first plant, letting the size of the pot determine the size and depth of the hole (Photo 7). Ideally, the top of the potting soil around the plant should meet the grade of the bed. Clean out the hole with your hands and soak its bottom and sides with water-soluble fertilizer designed for starting plants (Photo 8).

Next, lift the plant from its starter pot and pull some of the roots away from the ball (Photo 9). Set the ball in the hole, spreading the loose roots as you go, and press down firmly on the ball to eliminate any air pockets. Finally, fill the remainder of the hole with soil, mounding it slightly around the base of the plant (Photo 10). Pack this mound firmly and sprinkle it with another shot of fertilizer (Photo 11). Then, flood the area with water.

Repeat this process until you've planted all your flowers. The only variations will be in the size, and occasionally the location, of the hole. For instance, tiny plants require only a slight depression in the soil (Photo 12). And when planting in a border, be sure you don't plant too close to the fence or wall. Determine the eventual diameter of the back row of plants and stay at least half that distance away (Photo 13). Finally, cover the ground with at least 3 in. of mulch to retain moisture and discourage weeds (Photo 14).

With your planting finished, there's one more step you might take to encourage a good start. If the flowers you buy have blooms, it helps to pinch them off (Photo 15). This allows the plant to invest less in top growth and more in root development. PM



Only your Sherwin-Williams store has WoodScapes® exterior stain, the secret to a beautifully stained home. WoodScapes stain deeply penetrates the wood's surface, sealing out the elements. Which is why it comes with up to an 8 year warranty. For long-lasting beauty, there's nothing like WoodScapes. Call 1-800-4-SHERWIN (1-800-474-3794) for a store near you.

When only the best will do.
Ask Sherwin-Williams.™

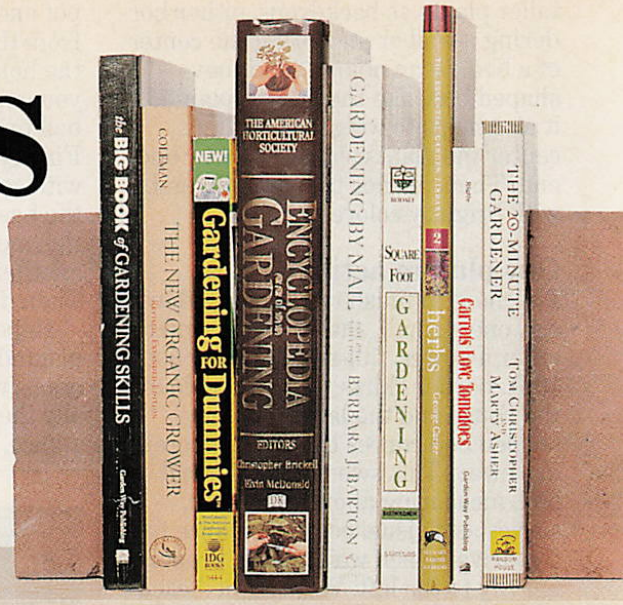
SHERWIN WILLIAMS
PAINT, STAIN AND WALLPAPER STORES

© 1998 The Sherwin-Williams Company.

Gardener's Bookshelf

No matter what you grow, there's a book that helps you do it better.

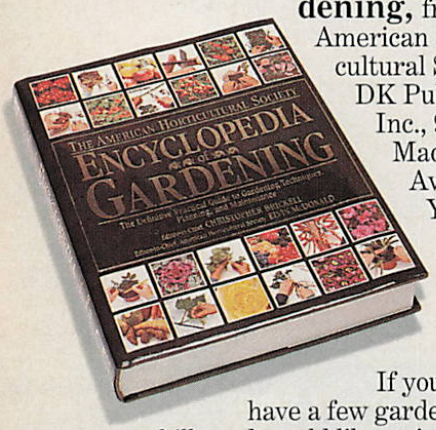
TEXT AND PHOTOS BY MERLE HENKENIUS



There is something appealing about growing your own food, flowers and trees. And, if the book market is any indication, the appeal is both widespread and on the rise. In the past year, books on gardening and small-scale growing have appeared at the rate of one per day, taking their places next to hundreds of established books and covering everything from botany to plot layout to garden Zen.

With so many books to choose from, we thought it might be useful to pick a few of the most interesting with an eye toward finding something for everyone. This is not a what's-new selection, but a group of good and useful, timely or time-tested books. No matter how you approach gardening, there's sure to be at least one book here to pique your interest.

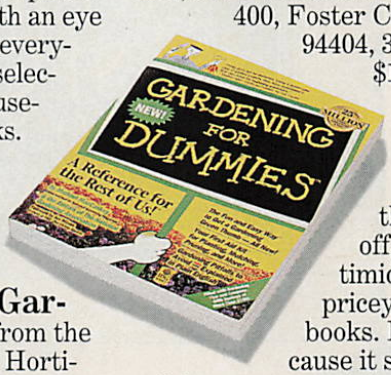
The Encyclopedia Of Gardening, from the American Horticultural Society, DK Publishing Inc., 95 Madison Ave., New York, NY 10016, 648 pages, $59.95.



If you already have a few gardening skills and would like a single reference for every possible project, condition or problem, the *Encyclopedia Of Gardening* is one of the best. It's basic enough to coax along the beginner and complete enough to satisfy the experienced gardener. It's also very well illustrated, with over 3000 color photos and drawings.

As for content, it covers everything from ornamental trees to houseplants, vegetable gardens to plant selection, insect and disease control to step-by-step instructions on how to build a retaining wall or garden fence. It's comprehensive, clearly written and authoritative.

Gardening For Dummies, IDG Books World Wide Inc., 919 E. Hillsdale Blvd., Suite 400, Foster City, CA 94404, 335 pages, $16.99.

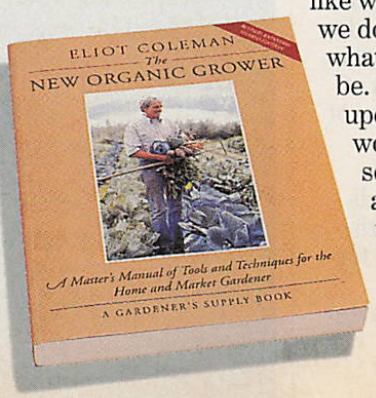


Gardening For Dummies is a primer for those of us put off, or simply intimidated, by larger, pricey coffee-table books. It succeeds because it simplifies the subject, presents it in accessible language and provides an overview with enough details to get started.

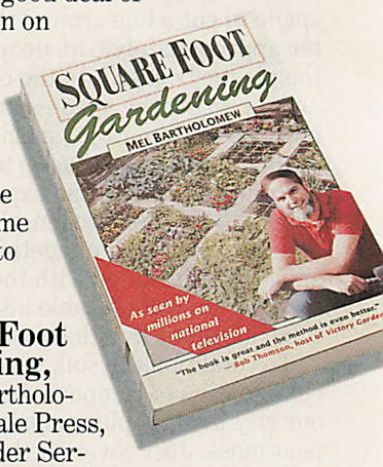
The content touches on everything from garden planning to soil types. While it's a little short on vegetables, trees, lawns and flowers receive substantial attention.

The New Organic Grower, by Eliot Coleman, Chelsea Green Publishing, P.O. Box 428, White River Junction, VT 05001, 340 pages, $24.95.

Organic growing is a return to, and refinement of, age-old farming practices that succeed without the pesticides, herbicides and chemical fertilizers we've come to rely on today. Organic methods work especially well in the home garden, where plant numbers and varieties are manageable and healthy food is the whole point of the endeavor.

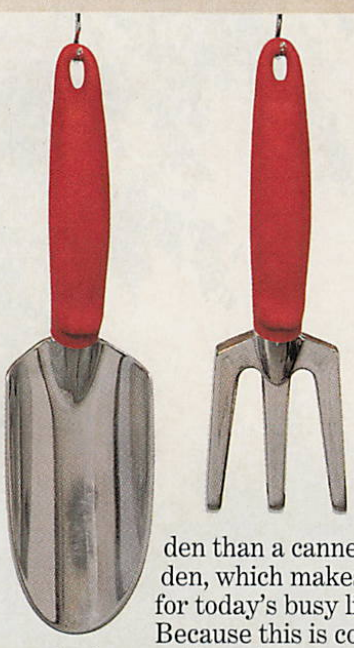

ELIOT COLEMAN
The NEW ORGANIC GROWER
A Master's Manual of Tools and Techniques for the Home and Market Gardener
A GARDENER'S SUPPLY BOOK

The book covers matching plant types to soils, pitting helpful insects against destructive ones, planting nitrogen-fixing plants near nitrogen-dependent plants, and other practical ways to balance gardening elements for quality yield. Although this book includes a good deal of information on larger-scale production, there's plenty here for any home gardener to consider.



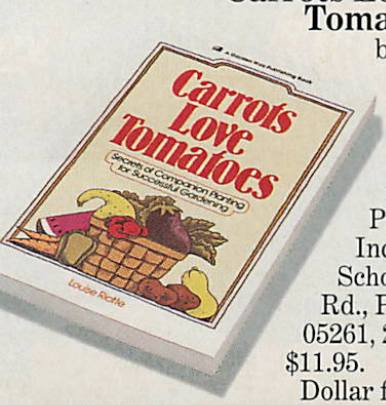
Square Foot Gardening, by Mel Bartholomew, Rodale Press, Book Reader Service, 33 E. Minor St., Emmaus, PA 18098, 347 pages, $16.95.

Mel Bartholomew seems to know why so many of us lose interest in our gardens around midseason: We plant like we need the food and garden like we don't. His solution is to redefine what the hobbyist's garden should be. He says it should not be row upon row of seasonal stooping-over work, but a few manageable 1-ft. squares that are easy to reach and too small to support many weeds. It's like container gardening, only more systematic. In practice, the square foot garden is more a grazer's gar-



den than a canner's garden, which makes it ideal for today's busy lives. Because this is concept gardening, you'll need the book to get it right. With it, you'll learn how to build the raised bed, what soils to use, how many seeds to plant, how to mix your own fertilizers, how to control weeds—all the information for creating a garden you'll stick with and eat from.

Carrots Love Tomatoes,

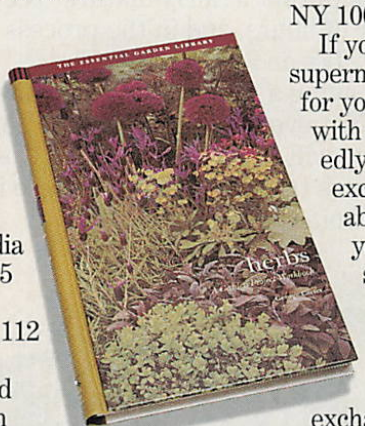


by Louise Riotte, Garden Way Publishing/Story Publishing Inc., 105 Schoolhouse Rd., Pownal, VT 05261, 226 pages, $11.95.

Dollar for dollar, this book contains more fascinating information than any other book we considered. The subject is companion planting, or using one type of plant to benefit another. For example, some plants produce root secretions or leaf and flower odors that repel or attract certain insects. Others fix nitrogen in the soil, which stimulates growth in their companions. Some concentrate minerals in their stocks, which when plowed under, nourish mineral-dependent plants.

This book is organized like an encyclopedia. It lists hundreds of plants and describes their attracting or repelling properties, suggests companion plants, and leaves you to pick and choose based on your garden's needs. If you're interested in organic gardening, this is one to own.

Herbs, A Garden Project Workbook,



by George Carter, Stewart, Tobori & Chang/U. S. Media Holdings Inc., 575 Broadway, New York, NY 10012, 112 pages, $22.50.

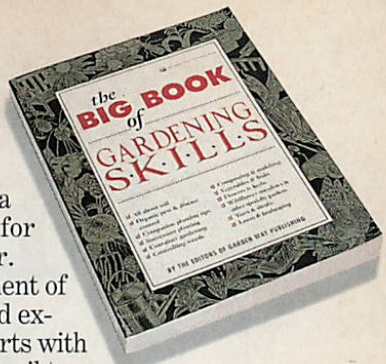
There is a good deal of interest in herbs these days, for cooking, for their varied scents, and in some cases for their medicinal qualities. Herbs are also structurally varied, so that many gardeners like to include them in their flower and vegetable gardens for visual interest.

You'll find lots of useful herb books on the market, but we like this one for its projects. It's a very simple book, with straightforward language, colorful photos and simple how-to drawings. It covers everything from formal European-style herb gardens to window boxes, and shows how to design, build and manage each. Materials lists are included.

The Big Book Of Gardening Skills,

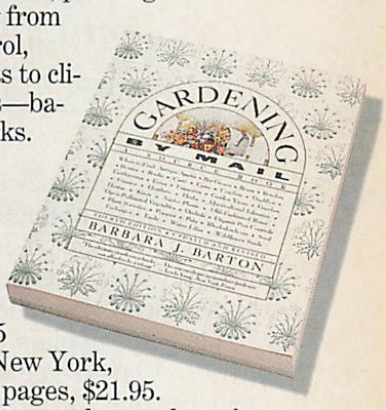
by the editors of Garden Way Publishing/Story Publishing Inc., 105 Schoolhouse Rd., Pownal, VT 05261, 246 pages, $18.95.

The finer points of gardening theory are interesting, but they won't help much if you don't possess the basic skills. That's why this book is a good choice for the beginner.



Its treatment of soils is a good example. It starts with the basics of soil type, preparation and modification, and goes on to show how to sterilize soil for potting purposes. Like most big books, it covers lawns, flowers, vegetables, fruit and shade trees, pruning techniques, seasonal reminders, planting from seeds, planting from sets, pest control, matching plants to climate, and tools—basically, the works.

Gardening By Mail,



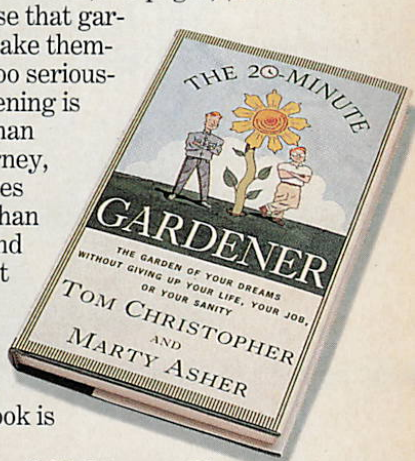
by Barbara J. Barton, Houghton Mifflin Co., 215 Park Ave. S., New York, NY 10003, 440 pages, $21.95.

If you buy your garden seeds at the supermarket, this book's probably not for you. But if you like experimenting with the old, the new and the decidedly different, then consider this an excellent source. It contains just about every mail-order specialty you might want, from heirloom seeds to bat guano. It includes sources for gazebos, gardening newsletters, seed catalogs, native plants, organic pest controls and fertilizers, seed exchanges, conventions, trips, guided tours, and much more.

The 20-Minute Gardener,

by Tom Christopher and Marty Asher, Random House Inc., 201 E. 50th St., New York, NY 10022, 223 pages, $19.95.

If you sense that garden writers take themselves a bit too seriously, that gardening is more work than spiritual journey, that it requires more sense than sensibility, and that it doesn't take a landscape architect to design a potato patch, this book is for you.



The message? Lighten up. Plant a simple garden with low-maintenance plants, tinker with it 20 minutes a day, and eat till your heart's content. **PM**

GARDENING GUIDE

Planting Mature Trees

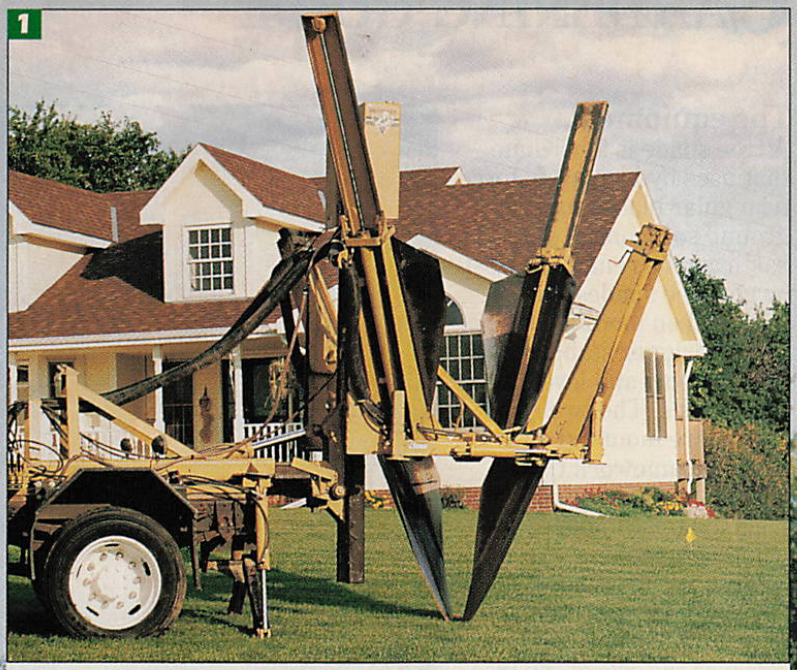
Cut years off your landscaping schedule with the right equipment and transplanting know-how.

TEXT AND PHOTOS BY MERLE HENKENIUS

Nothing can grace a yard like well-established trees, but if you're starting with saplings, it can take a generation or more for your trees to reach full bloom. Of course, you'll enjoy the benefits of maturing trees along the way, but it can still be a long wait for real summer shade and the balanced visual heft your landscaping needs.

This helps explain the increasing popularity of truck-mounted tree spades. A large tree spade can uproot a fairly mature tree and plunk it down in your yard in a matter of hours, and in the process shave a decade or more from the wait. It's an appealing option.

If you've been thinking of having a large tree transplanted, there's really quite a lot to consider. Not every property is right for mature transplants, and not every tree will survive the ordeal. Cost is also an issue. Still, transplanting mature trees makes good sense in many cases, so let's consider the process, from the ground up.



The first step takes place at the planting site. Here, the truck-mounted tree spade prepares to remove a plug of soil for the new tree.

The equipment

A tree spade is a machine that uses hydraulics to force triangular blades into the ground so a conical plug of earth can be removed. Most larger tree spades are mounted on modified trucks with outrigger stabilizers that support and level the four blades. The two rear blades are mounted on a hinged framework that allows the back of the machine to swing open when approaching a tree.

Tree spades come in a variety of sizes to accommodate a wide range of trees. Because the size of the tree influences the machine that's used, make your requirements clear before you hire someone to do the work. Standard equipment ranges from 20-in.-dia. nursery machines to 92-in. behemoths. The diameter refers to the width of the soil plug as measured at the surface. This measurement divided by 10 defines the size of tree that can be moved successfully. A 20-in. spade, for example, is pretty much limited to a tree with a 2-in.-dia. trunk as measured 12 in. from the ground.

At the other extreme, a 92-in. spade, mounted on a semitrailer, can transplant a 30-ft.-tall tree. The very size of these rigs is limiting, however. Job-site maneuverability can be a problem, and with a 92-in. bite the soil plug alone can weigh 12,000 to 14,000 pounds. Greater equipment costs, plus higher prices for really big trees, substantially limit the customer base. The final bill for a single transplant can exceed a couple of thousand dollars. Because of this, market pressures generally dictate smaller spades, usually in the 40- to 60-in. range. These work well on trees 6 to 12 years old, 4 to 6 in. in diameter and 12 to 20 ft. tall, depending on the species. The good news is that trees of these sizes have very good survival rates.

With the tree centered within the spade assembly, the hydraulically powered blades sever the soil and roots around the tree.

The tree must be strapped to the spade to hold it in place for travel. Then, the root plug is lifted from the ground.

The process

Each planting requires the operator to first remove a soil plug from your yard, thereby creating a hole for the new tree (Photo 1). Typically, this plug is then hauled to the nursery and dropped into the hole left by a previous removal.

At the nursery, the operator opens the gate-like rear half of the spade assembly and centers the blades around the tree. With the gates closed, the operator engages the hydraulics that drive the pointed blades into the ground (Photo 2). The trunk is strapped to the machine to keep it from shifting as it's transported (Photo 3).

Then, the operator uses a second set of hydraulics to lift the root plug from the ground, arching it over the back of the vehicle. In this way, the captured tree lies horizontally across the top of the truck for transport (lead photo).

At the planting site, the truck swings the tree back to a vertical position and centers the plug over the hole (Photo 4). After the plug has been lowered into place the blades are withdrawn.

When planning the job, keep in mind that a truck-mounted tree spade requires room to maneuver. Steep grades, overhead wires, the proximity of buildings and other location features can affect the feasibility of the transplant.

Note, too, that the combined weight of the truck and tree can crack sidewalks and make a mess of wet lawns or new sod. In new construction, it's best to plant trees before landscaping. Also, be sure to have your operator make the appropriate contact to see if buried utilities are present.

Ensuring success

The 10:1 ratio of spade diameter to tree diameter is less a mechanical limitation than a root-mass requirement. A tree that is uprooted must retain enough undisturbed root mass to replace moisture lost through the leaf structure by transpiration. This also explains why survival rates decrease in summer and increase during the cooler months of autumn.

To improve survivability in spring and summer, you might use a larger machine to transplant smaller trees. There are also commercial products that can be sprayed on leaves to temporarily reduce transpiration. And finally, tree species vary in transplant hardiness. A spruce, for example, transplants well, so you might get away with planting a 6-in.-dia. spruce with a 50-in. spade.

In fact, most evergreens transplant easily because they have shallow root systems. Some other species, including oak and walnut trees, send down

deep tap roots that take much longer to regenerate.

To complicate matters further, dry, rocky soil will encourage shallow-rooted trees to grow deep, while rich, loamy soil will encourage shallow growth in deep-rooted trees. None of these factors forecloses transplanting altogether, but they are points to discuss with your nursery. Certain trees may be better planted as saplings.

Deep tap roots also pose a mechanical problem. A tree spade's four blades don't come together completely when fully extended. Therefore, they don't always sever the tap root as far below ground level as possible, but break it off—sometimes fairly close to the surface—when the root ball is lifted. If you'll be planting a lot of these trees, or fairly large ones, look for an operator whose equipment has a spade extension designed to sever tap roots.

Ballpark pricing

Local conditions vary substantially, so it's not possible to say exactly how much you'll pay to have a mature tree planted in your yard. The two variables are the cost of the tree and the cost of moving it to your site.

With the truck positioned near the hole, the tree is lowered into place, and the blades withdrawn.

Unless you're transplanting a tree from your own property or have been offered one for free, you'll probably buy from a local nursery. And, while prices vary widely, it's a good bet that you'll spend at least $200 for a locally common species seven to 10 years old. On the other hand, a perfectly shaped blue spruce can run $350 to $500. In other words, the tree can be the wild card in your pricing estimates.

As for the moving costs, where you live will influence what you pay. Operators who have to deal with heavy traffic, long distances or rocky soil that takes its toll on equipment, will charge more. Some charge by the hour (often $60 to $70), while some set a basic fee and add mileage, and others fix a price for the entire job. In most cases, you can expect a volume discount. If the moving costs for one tree were $100, you might get six trees transplanted for a moving fee of $30 apiece. In our case, we paid $125 for our tree and $100 for the move.

Aftercare

The care you give your new tree after it's planted will greatly affect its chances of surviving that first, crucial year. The two most important steps to take initially are to stake the tree so it's adequately supported and to backfill the seam between the root ball and the surrounding soil.

Drive at least three heavy stakes into the ground, well beyond the root ball, and anchor the tree to the stakes with wire or nylon cord (Photo 5). To keep from abrading the tree trunk with the support ties, run the wire or cord through a short length of garden hose where it meets the tree. You can also buy products for this purpose.

After planting, stake the tree and secure it with wire or nylon cord. Run the wire through lengths of garden hose around the trunk to prevent abrasion.

Fill the seam with sand or soil, then flood it with water. With well-draining soils, repeat in a few days. Avoid overwatering in clay soils.

As for the root-ball seam, the goal is to eliminate any air pockets between the ball and the surrounding soil. In loam or sandy soil, simply flooding the gap may do it, but in most cases you'll need to pour soil or sand around the seam and then flood the area with water. If you see the gap opening later, repeat the process.

Adequate water is another critical factor. Because it's just as easy to kill a tree with too much water as with too little, you'll need to watch the situation carefully. Soil type is the biggest factor. Heavy clay soils don't absorb water very well, so overwatering is more likely in clay. A good test of soil percolation is to flood the hole one-third full of water just after it's dug. If most of the water soaks away in about an hour, overwatering will be less likely.

In any case, after the tree is planted and backfilled, flood the seam thoroughly (Photo 6). With non-clay soils, repeat the process a few days later, then water normally, just as you would your lawn.

As for fertilizer, wait until the following growing season. The goal in the beginning is not tree growth but root healing. If you add anything, make it a root stimulator, which is primarily vitamin B-1. These common plant starters may contain some fertilizer, but will have little or no nitrogen. The best time to add a root stimulator is when you flood the seam initially. **PM**

GARDENING GUIDE

Container Gardening

Not ready to rip up the lawn for your lettuce? Dig in on a smaller scale.

TEXT AND PHOTOS BY MERLE HENKENIUS

If you love flowers, fresh vegetables and culinary herbs, but lack the space, the tools or the energy for a conventional garden, then think small, portable, manageable—think container gardening. While no one expects to sustain a growing family on these micro-Edens, containers can supplement a good many meals with fresh herbs and produce, while making your deck or patio more inviting.

Unless you really need or want the bounty of a conventional garden, container gardening has much to recommend it. At the top of list is the fact that you don't need a garden space. Any patio, deck, nook or cranny will do, provided it gets enough sun. Secondly, because potting soil contains few weed seeds, much of the stooping-over work associated with conventional gardens is eliminated. The few weeds that do appear are easy to reach in elevated pots and easy to pluck from fluffy soil. Commercial soils are also largely free of soil-borne plant diseases. And finally, container gardens are portable. They can be repositioned to accommodate seasonal changes, and if you need to move in July, you can always take your garden with you.

About containers

Many types of containers will work for container gardening, as long as they can drain through the bottom. You can be as creative as you please: Petunias in an old pair of work boots, anyone? But pay close attention to size. Container size affects growth and productivity, so larger plants, such as tomatoes, peppers and dwarf fruit trees, will need larger pots, usually 3 to 5 gal. in size. Smaller flowers and herbs can often get by in ½- to 1-gal. containers. Low-growing vegetables, such as lettuce, spinach and radishes, should be rooted in at least 1 gal. of soil. Green beans will do well in 2-gal. containers. Generally, plants grow smaller in containers than they would in an open garden, but careful plant selection can help offset the difference in productivity.

Cut a piece of landscape fabric to fit the bottom of your container. This keeps gravel and soil from clogging the drain hole.

Place the trimmed piece of landscape fabric in the bottom of the pot. Make sure it covers the entire base.

To provide a drainage reservoir for overwatering, pour about 2 in. of mixed aggregate gravel onto the fabric.

Cover the drainage gravel with a second layer of fabric to keep the soil from washing into the gravel.

Pour a few inches of soil into the pot. Then push a bamboo pole in place to support the plant as it grows.

Fill the pot to within an inch of the top with professional potting soil. This mix will not compact like normal soil.

As for container materials, you can use coffee cans, old buckets, wheelbarrows, homemade wooden boxes or plastic, glazed or terra-cotta pots—whatever suits the neighborhood. Again, size and adequate drainage are the keys.

If you build your own garden boxes, rot-resistant cedar and redwood are good material choices. Avoid pine, fir, plywood or strand board. While CCA-treated lumber is generally chemically stable, some types of treated lumber can leach chemicals into the soil. If healthy food is your garden's main purpose, a chemically treated container is probably not a good choice.

As for unglazed clay pots and their plastic imitators, plastic actually offers an advantage. Terra cotta is porous and can leach water. Plastic is impermeable and therefore needs less frequent watering. Plastic is also less expensive.

Soil types

Ordinary garden soil is a poor choice for use in containers, largely because frequent watering compacts it, restricting root development. Common soils also hold less water and dry out quicker. Potted plants really need a well-aerated medium that remains fluffy and retains moisture.

By far the easiest approach is to buy one of the commercially prepared potting soils, which will contain some of the following components: soil, peat moss, compost, rotted manure, pine bark, perlite, vermiculite and sand. These lightweight commercial "soils" remain fluffy and water-absorbent and are usually pasteurized to rid them of microorganisms that cause plant diseases. You'll need to add some sort of fertilizer on a regular basis, however.

If you prefer to make your own potting soil, blend equal parts of soil, sand, sphagnum peat moss, compost and perlite or vermiculite. Finish by adding either chemical or organic fertilizer to the soil. (If you plan to eat what you grow, the organic option is worth trying.) Then, moisten and mix well. If wind will be a potential problem with tall plants, you can add more sand to increase the weight of the pot, whether using your own mix or a commercial soil. Glazed or terra-cotta pots also provide weight and stability.

Choosing your plants

Many garden varieties are engineered for specific climates, so your best source of information here will be your local garden center or USDA Cooperative Extension agent. As for general guidelines, the amount of sun your garden site receives is important. Vegetables

that produce fruit, like tomatoes, peppers and beans, require more sunlight, at least 6 hours of full sun per day. With less direct sunlight, root and leafy vegetables are better choices.

Low-growing plants are best for container gardening. They are less susceptible to wind damage and they take up less space. When choosing fruit bearers, like tomatoes and squash, look for bush or determinate varieties. These are smaller in stature, but still produce well. Good choices among low-growing smaller vegetables are lettuce, chard, beets, radishes and dwarf peppers. Leaf lettuce, by the way, can be harvested more or less continually if you limit your pickings to the outer leaves. As for culinary herbs, plant them in small containers and bring them inside in the fall for fresh, winter-long seasonings.

Digging in

Planting in containers is not substantially different from planting out in the open, but there are a few more steps. We chose a Husky Red tomato plant (dwarf-indeterminate), which produces ripe 5- to 7-ounce tomatoes in about 70 days. We planted it in a 3-gal. terra-cotta pot using commercial potting soil and a bamboo support pole.

Begin by cutting a piece of landscape fabric (Photo 1) and placing it in the bottom of the container to keep gravel and soil from washing through the drain hole (Photo 2). Then, to provide a drainage reservoir, pour about 2 in. of mixed-aggregate gravel into the bottom of the container so that it covers the fabric (Photo 3). Follow

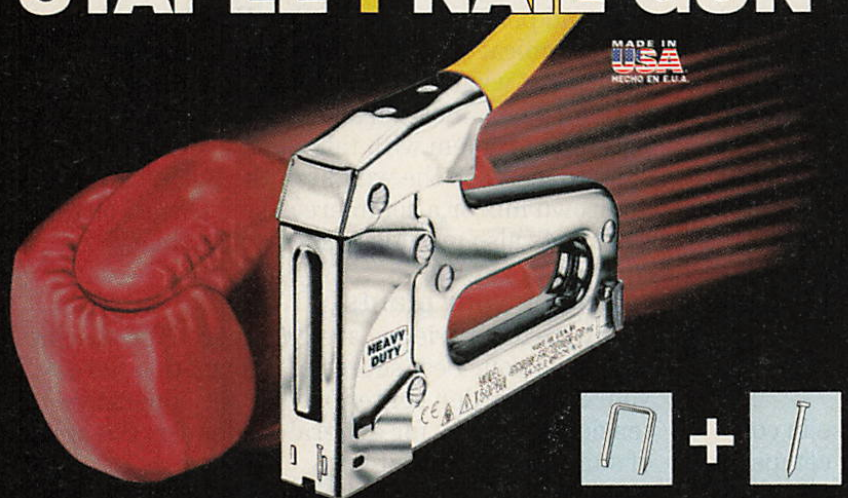
Press down the top of the soil with your hands, then use a planting trowel to dig a hole about 4 to 5 in. deep.

Carefully remove the plant from its nursery container and gently crumble about half the soil from the roots.

Carefully spread the roots apart and set the plant in the hole. Backfill the soil and gently compact it around the stem.

ARROW®

The All New T50®PBN
STAPLE + NAIL GUN



It Packs A *One-Two* Punch
It Staples! *It Nails!*

Meet the 21st Century ARROW T50PBN

- **All Steel Construction** with long lasting chrome finish.
- **Easy Squeeze** double leverage mechanism for professional performance with no loss of driving power.
- **Cushioned Non-Slip Hi-Viz Handle.** Comfortable to use. Easy to locate.
- **Visual Refill Window** tells you when to reload.

Packs a Double Wallop

- **The new T50PBN shoots 6 different size staples:** 1/4", 5/16", 3/8", 1/2", 9/16", and 17/32" Ceiltile staples. You can handle any job from upholstering a chair to insulating basements and attics.
- **It also drives a 5/8" nail** so you can decorate a door panel, build a picture frame, or create doll houses and toys for the kids.
- **ARROW T50PBN. Solid. Reliable.** Perfect for the handyman, the professional, and the hobbyist. *You work hard for your money, spend it wisely.*

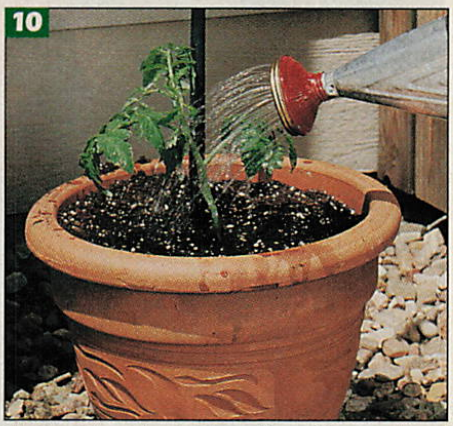
ARROW tools and supplies are available at home centers, lumberyards and hardware stores.

ARROW®
© 1998 ARROW FASTENER CO., INC.

ARROW FASTENER COMPANY, INC., 271 MAYHILL STREET, SADDLE BROOK, N.J. 07663
ARROW FASTENER (U.K.) LTD., 14 BARCLAY ROAD, CROYDON, SURREY CR0 1JN
JARDEL DISTRIBUTORS, INC., 6505 METROPOLITAN BLVD. EAST, MONTREAL, QUEBEC H1P 1X9
website: www.arrow-fastener.com

with a second layer of landscape fabric to keep the soil from washing into the gravel (Photo 4).

Because tomatoes need support as they mature, place a bamboo or wooden support post in the pot (Photo 5) and pour in the soil until the pot is almost full (Photo 6). When the pot is filled to within 1 in. of the rim, press the soil down with your hands to provide a solid planting bed and to remove any air pockets.



Water the plant liberally with a mix of water and fertilizer. Follow with a spray of clean water on the leaves.

When the plant grows about 12 in. high, support it by carefully tying the stem to the bamboo pole.

To plant the tomato, start by scooping out a small hole with a garden trowel (Photo 7) or your hands. Remove the tomato from its container flat and carefully pull away some of the soil to expose the balled root system (Photo 8). Spread some of the longer roots outward and carefully set the plant in its hole, with some of the roots pulled toward the rim of the pot. Then, cover the root system with soil and press this soil down firmly around the stem of the plant (Photo 9). Finish by mixing water-soluble fertilizer in a watering can and thoroughly flooding the pot with this mixture (Photo 10). Then spray clean water over the plant to remove any soil and fertilizer that may be sticking to the leaves.

Watering

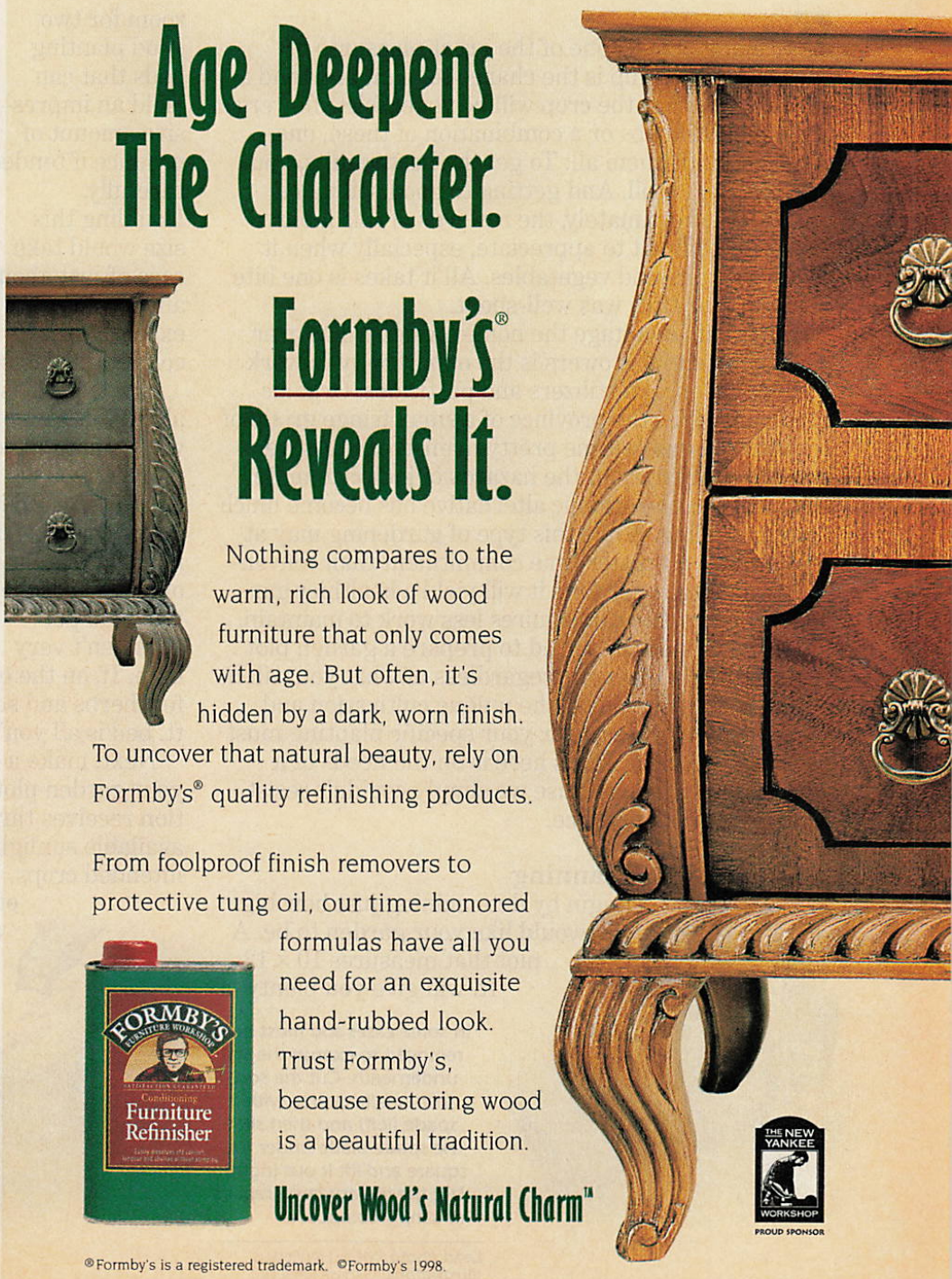
The biggest difference between container gardening and conventional gardening is the amount of water and fertilizer you'll need to apply. Root systems in containers cannot seek out moisture and nutrients that lie several feet away. For this reason, you'll need to water and fertilize often. While occasional water-stressing won't kill a plant, it does invite infestations of spider mites and other pests. Thorough waterings also flush out water and fertilizer-borne salts that can damage plants.

Water at least every other day in warm weather, and every day when it's hot and windy. After a week or so of watering, you should be able to tell how much moisture your plants need to flourish. Fertilize every 10 to 14 days throughout the growing season. This is especially important when the fruit sets on and begins to ripen.

When your tomato starts reaching the sky, as it should, help it stay up by tying the main stem loosely to the bamboo support pole (Photo 11). **PM**

Age Deepens The Character.

Formby's® Reveals It.



Nothing compares to the warm, rich look of wood furniture that only comes with age. But often, it's hidden by a dark, worn finish. To uncover that natural beauty, rely on Formby's® quality refinishing products.

From foolproof finish removers to protective tung oil, our time-honored formulas have all you need for an exquisite hand-rubbed look. Trust Formby's, because restoring wood is a beautiful tradition.

Uncover Wood's Natural Charm™

THE NEW YANKEE WORKSHOP
PROUD SPONSOR

®Formby's is a registered trademark. ©Formby's 1998.

Proper Soil Prep

What comes up will only be as good as what's down there. Here's how to get off on the right foot.

BY NEAL BARRETT

For many people, one of the great pleasures of property ownership is the chance to plant and tend a garden. Whether the crop will be vegetables, flowers, ornamental shrubs or a combination of these, one constant binds them all: To get the best results, you will need good soil. And getting to good soil takes some work. Fortunately, the rewards of this labor aren't too difficult to appreciate, especially when it comes to fruits and vegetables. All it takes is one bite to know your time was well-spent.

One great advantage the home gardener has over most commercial growers is the opportunity to work without chemical fertilizers and pesticides. Organic gardening, once the province of a small fringe group of enthusiasts, has become pretty mainstream. As we have all learned about the hazards of indiscriminate chemical use, the organic alternative has become much more appealing. While this type of gardening may at first require a greater time commitment than conventional planting, over time it will yield a healthier garden environment that requires less work to maintain.

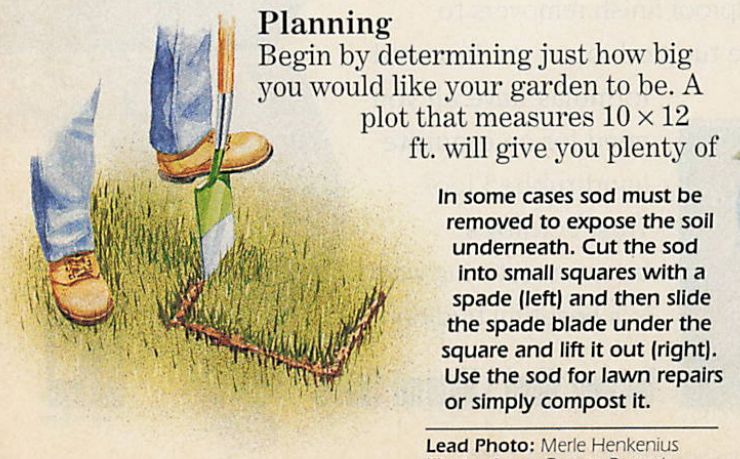
The basic steps required to prepare a garden plot are essentially the same regardless of what you will be planting. At some point, the unique cultivation and nutrient requirements for your specific planting must be considered. Our focus here is on the needs of a vegetable garden, because we simply couldn't resist the lure of fresh produce.

Planning

Begin by determining just how big you would like your garden to be. A plot that measures 10 × 12 ft. will give you plenty of room for two good planting beds that can yield an impressive amount of produce if tended carefully. Doubling this size would take care of just about anyone's needs except for hardcore enthusiasts.

Garden size is also a function of what you want to plant. If you're only interested in sweet corn, you'll need quite a bit of room because the yield per plant isn't very high. If, on the other hand, you only want to grow a few herbs and some salad greens, then a single 3 × 6-ft. bed is all you'll probably need.

Next, make a careful study of the land available for your garden plot. Notice how much sunlight each location receives throughout the day and compare the available sunlight with the requirements of your intended crops. Your local nursery is a great source of specific plant requirements, as are any number of comprehensive gardening books (see "Gardener's Bookshelf," page 98). Generally speaking, the more sunlight the better. Then, examine the ground after a heavy rainfall to see if there is any standing



In some cases sod must be removed to expose the soil underneath. Cut the sod into small squares with a spade (left) and then slide the spade blade under the square and lift it out (right). Use the sod for lawn repairs or simply compost it.

Lead Photo: Merle Henkenius
Illustrations: George Retseck

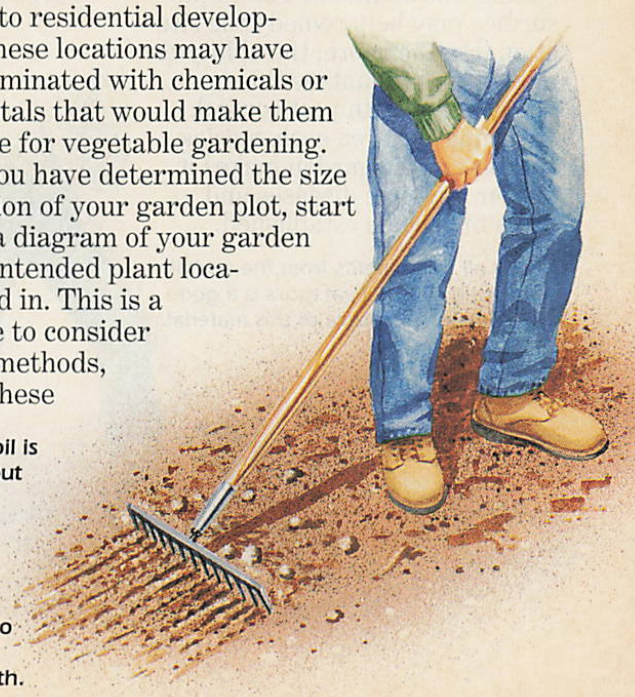
A power tiller is a great way to break up soil and turn under soil amendments. For large plots, it's almost a necessity.

Soil can also be turned over by hand. Just dig trenches, add soil amendments and shovel the topsoil back into the trench.

water on your potential plot. This usually indicates a drainage problem with the soil. Poor drainage, except in extreme cases, is a condition that can be fixed. But most remedies require extensive work that most of us would rather avoid. If you have another option for your plot location, seriously consider it. Also think about the slope of the land. A relatively flat, level plot will have less trouble with water runoff and soil erosion.

Finally, see if you can find out about any prior uses of your preferred plot and its surrounding area. In some places, old farms or industrial sites have been turned into residential developments. These locations may have soil contaminated with chemicals or heavy metals that would make them unsuitable for vegetable gardening.

Once you have determined the size and location of your garden plot, start drawing a diagram of your garden with the intended plant locations filled in. This is a good time to consider planting methods, because these



Once the soil is tilled, rake out the loose rocks and roots to make planting easier and to discourage weed growth.

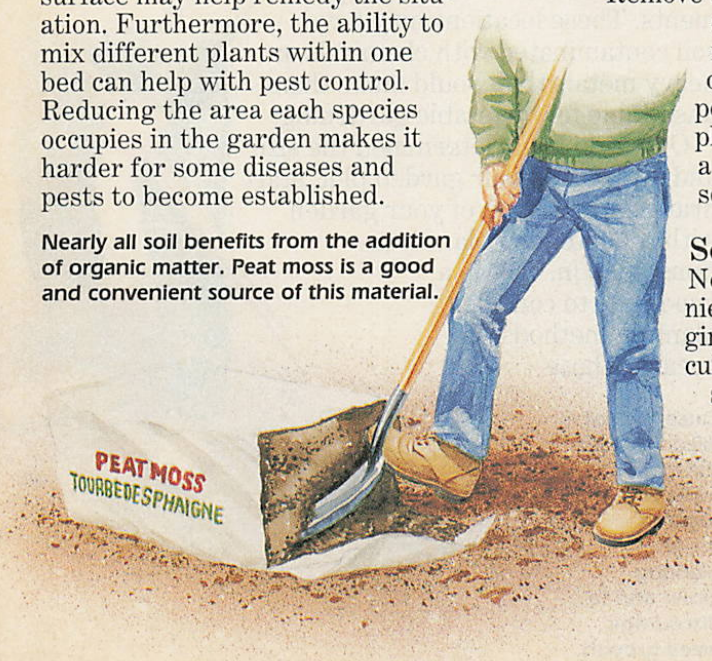
GARDENING GUIDE

Take soil samples from several different areas of the garden, then have them tested for pH and nutrient content.

will influence your garden layout.

Traditionally, vegetables have been placed in rows, with different spacing between the rows and the plants, depending on the specific plant requirements. Raised planting beds, however, offer a more efficient use of your garden space. These beds are typically about 3 ft. wide and 6 ft. long, with aisles of 18 to 24 in. between them. You can form them by removing the topsoil from the aisles and adding it to the bed areas. In some instances, you may also have to bring in additional topsoil to build up the beds. The soil can either be simply mounded into beds or you can construct retaining walls around each bed with stone, concrete blocks, bricks or wood planks.

Raised beds have several advantages over traditional row planting. The greater depth of topsoil provides a more fertile, better-aerated environment with more nutrients. And, if drainage is a problem, adding this additional soil to the surface may help remedy the situation. Furthermore, the ability to mix different plants within one bed can help with pest control. Reducing the area each species occupies in the garden makes it harder for some diseases and pests to become established.



Nearly all soil benefits from the addition of organic matter. Peat moss is a good and convenient source of this material.

And, by spacing plants closer together, more soil shade is created, which reduces weed growth and keeps the soil cooler.

Getting started

The best time to start a new garden plot is in the fall. This allows more time for any soil amendments you use to begin breaking down, thus becoming more available to the plants. Soil amendments are materials that you can add to the soil to modify the pH level, provide specific nutrients to the soil, increase organic content or improve drainage and soil texture.

You also have the option of planting a green manure crop that can be worked into the soil in the spring, further enriching the garden. A green manure is a crop that is planted in the fall and then worked back into the soil in the spring, adding both organic material and nutrients such as nitrogen and phosphorus to the garden. These crops also prevent erosion through the winter and increase drainage in densely compacted soil. Good choices for green manure are clover, barley, winter rye and buckwheat.

Begin by marking the outlines of your garden plot with stakes and string, or simply spread a line of ground limestone around the plot. If you are turning a section of lawn into your garden, you will first need to remove the sod. For a small garden, a spade will be sufficient for the task. Make vertical cuts into the sod to form sections of 1 to 2 sq. ft., then slide the tool under each section to sever the roots from the soil.

Remove the sod sections and either use them to repair worn sections of your lawn or compost them. For large plots, consider renting a manual or power sod cutter.

Soil testing

Now is also a convenient time, before beginning your garden cultivation, to test the soil for pH and nutrient content.

There are do-it-yourself kits available for testing the pH, but for a complete nutrient analysis it's best to take a soil sample to a private laboratory, your local nursery or garden center, or to your county's USDA Cooperative Extension agent. If you would like to garden organically, be sure to specify that you would like recommendations for organic soil amendments when you deliver the sample.

After your plot is tilled once, evenly spread amendments over the entire surface, then till them into the soil.

The primary nutrients that most plants require are nitrogen, calcium, phosphorus, magnesium, sulfur and potassium. Your soil analysis report should show if the soil is lacking in any of these and should also make specific recommendations for improving the soil mineral balance. Some of the generally utilized soil amendments and their primary contributions are blood meal (nitrogen), bone meal (phosphate), peat moss and cow manure (organic matter), Epsom salts (magnesium), greensand (potash), gypsum (calcium) and fish meal (calcium).

The pH of your soil is a measure of its relative acidity or alkalinity on a scale of 1.0 to 14.0, with 7.0 being neutral. For general gardening, the pH should be between 6.0 and 7.0. If the pH is less than 6.0, the soil is too acidic and you will need to add either ground calcite limestone or wood ashes. If the pH is over 7.0, the soil is too alkaline and you will need to add either sulfur or organic matter such as evergreen tree needles to the soil. To correct an acidic soil, for example, 5 pounds of ground limestone for each 100 sq. ft. of soil should raise the pH by one point. To correct an alkaline soil, add 1 pound of sulfur per 100 sq. ft. to lower the pH by one point.

(Please turn to page 114)

THE DIFFERENCE BETWEEN

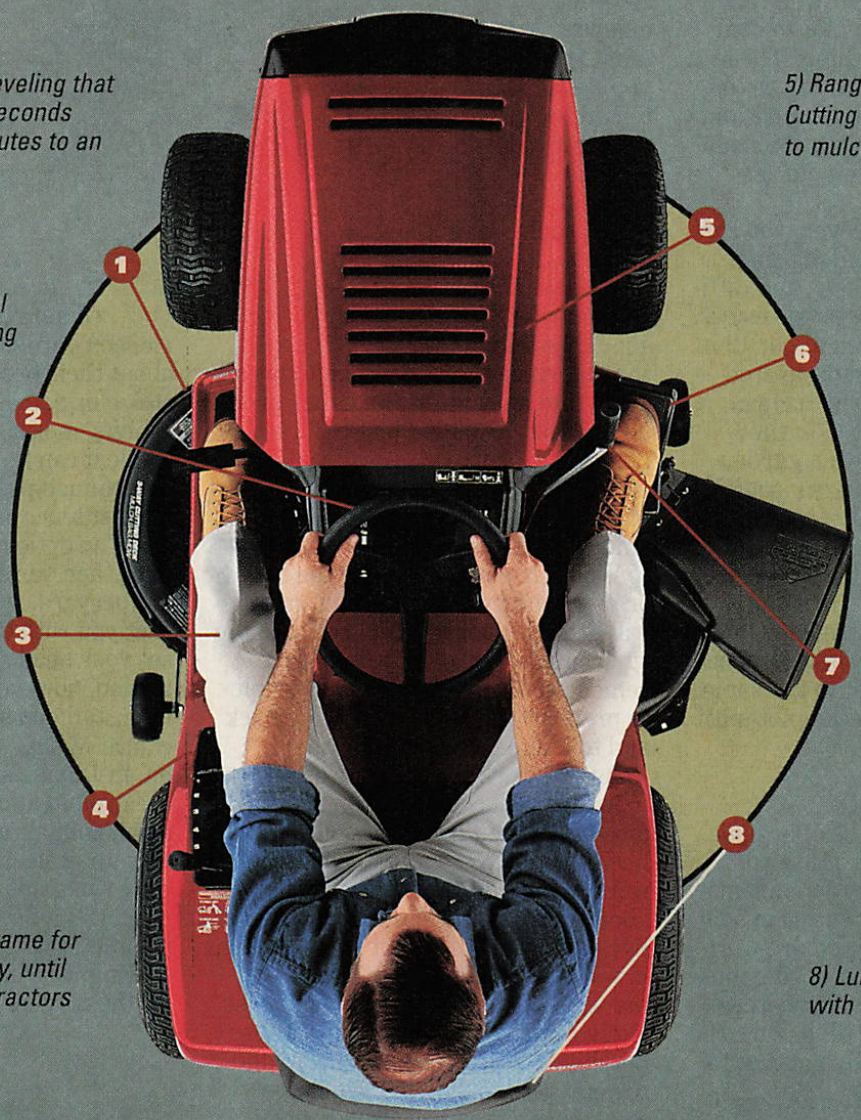
WIDEBODY™ AND EVERYBODY ELSE.

1) Tool-Free Deck Leveling that takes less than 60 seconds instead of thirty minutes to an hour.

2) Easy-To-Turn Dual Independent Steering reduces steering effort and increases maneuverability and handling.

3) Step-Thru Design and increased legroom for a comfortable end to stepping over high center consoles.

4) Solid Steel Rail Frame for strength and stability, until now only found on tractors costing much more.



5) Range of Horsepower and Cutting Widths with the ability to mulch, bag or discharge.

6) PedalTouch™ AutomaticDrive™ Transmission for control of both forward and reverse speeds without shifting or clutching.

7) Easy-To-Reach Controls located out of kneecap range for increased legroom.

8) Lumbar Support Seat with Fingertip Adjustment.

©1998, Murray Inc.

WIDEBODY MURRAY ENGINEERING

WE SET OUT TO REINVENT THE LAWN TRACTOR FROM THE GROUND UP. WE DID IT BY DESIGNING ONE FROM THE DRIVER DOWN.

WIDEBODY MURRAY ENGINEERING

A lot has happened in lawn tractor design in the past few years. Most of it at Murray. Because instead of building a lawn tractor from the mower up like everyone else, we decided to design one from the driver down. The result is a whole new way of thinking we call WideBody Engineering. Thinking that gives as much consideration to the arms, legs, lower back, seat and patience of the person who's going to operate our tractor, as we do to how well the darned thing cuts grass. Which is why only WideBody lawn tractors now come with the overwhelming slew of user-friendly features you see here.

If you've ever owned a lawn tractor before, forget everything you know. If you've never owned a lawn tractor, then you're in the enviable position of skipping a lot of costly and painful steps in the lawn tractor evolutionary chain. Because for price, comfort and performance today, there's the Murray WideBody and nobody else. Available in Murray, Murray Select and Murray Ultra models.

FOR A FREE LAWN TRACTOR BUYER'S GUIDE CALL 1-800-224-8940.

OR VISIT OUR WEB SITE: WWW.MURRAYINC.COM.

MURRAY

THE CUTTING EDGE OF VALUE™.

GARDENING GUIDE (Continued from page 112)

Turning the soil

For larger garden plots, it's a good idea to rent a gas-powered tiller to loosen the soil. Rotary tillers do a great job of breaking up compacted soil, cutting through roots and churning up stones from the top 8 to 10 in. of the soil. Depending on how hard your soil is, it might well take several passes over the plot to completely break up everything. These tillers also do a good job of working organic material, like peat moss and dried cow manure, into the soil. Add them as required before your last pass with the tiller.

For a small plot, however, you can break up the soil by hand digging. Though this process is slow and difficult, it can yield equally good results. Start by digging a trench about 12 in. deep and depositing the excavated earth along the side of the trench. Then break up the subsoil in the bottom of the trench with a garden fork. It's a good idea to work some organic material like compost, peat moss, cow manure or dried, shredded leaves into the subsoil. Then replace the topsoil, adding more organic material as you fill the trench. Once the trench is full, work the adjacent area of your garden plot in the same manner, moving across the plot until the whole area is done.

Adding amendments

The amount and type of organic matter that you add is dependent on the type of soil that you are working. A good general rule, whether you till or turn the soil by hand, is to incorporate at least a 2-in. layer of organic material into the topsoil. This addition will greatly improve the soil texture and its ability to hold water.

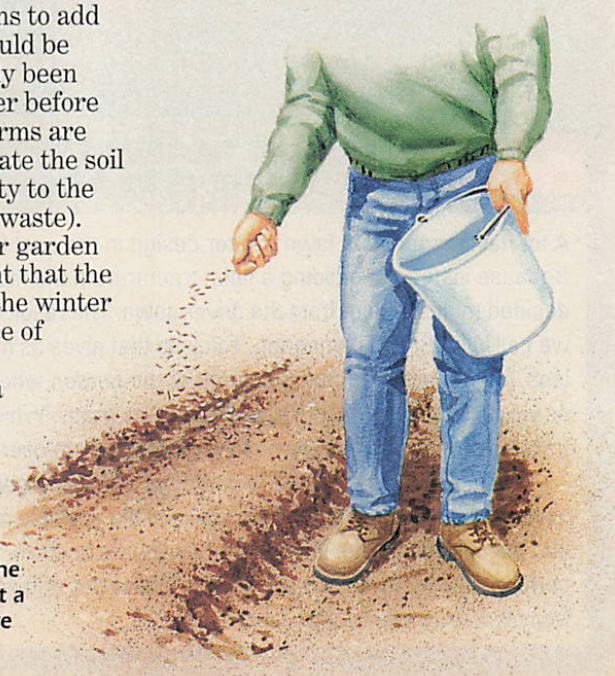
If you're working the soil by hand, turn any enrichment amendments into the soil using a sturdy garden fork.

Depending on the results of your soil test, there may be other amendments that you need to add to your garden soil. Some of these, such as rock phosphate and bone meal, should be added in the fall, since they take time to break down into a usable state. Other products should be added just before planting. Check with your local nursery or garden center for the appropriate timing for adding the soil amendments you need.

Whether you double-dig the beds or use a rotary tiller, the cultivation will bring loose roots and rocks to the surface. Using a sturdy steel rake, remove as many of these as possible to prevent weeds from growing back and to make planting easier.

As you work the soil, pay attention to its physical condition. One of the most important indicators of soil health is the presence of a vital earthworm population. In a random hole of about 1 cu. ft., you should find at least five earthworms. If your soil is lacking in worms, the addition of organic material over several years will most likely remedy the situation. It is also possible to order earthworms to add to your garden, but you should be sure that the soil has already been enriched with organic matter before introducing them. Earthworms are important because they aerate the soil and add considerable fertility to the garden with their castings (waste).

If you are preparing your garden site in the fall, it's important that the ground be covered during the winter months. You have the choice of covering the soil with an organic mulch or planting a green manure crop. Use of a mulch such as shredded leaves, grass clippings, hay or straw will not only protect the soil from erosion, it will also provide additional organic matter for the soil.



If you prepare your soil in the fall, it's a good idea to plant a green manure like winter rye before the frost sets in.

To create raised planting beds, rake up the soil into flat mounds that are about 6 in. high, 3 ft. wide and 6 ft. long.

Fencing

A final consideration in preparing your garden is what to do about a fence. Experienced gardeners all have stories about their precious crops being eaten, stolen or damaged by deer, squirrels, rabbits, moles, cats, dogs or raccoons. While it can be difficult to keep a determined pest out of the garden, a modest fence can deter most marauders. The options for a garden fence are many and varied. A trip to your local lumberyard or home center will present you with enough alternatives to set your head spinning. For basic protection, however, a simple wire fence with stamped steel posts is a good choice. Whatever approach you decide on, just make sure the fencing meets the ground at all points. Otherwise small animals are sure to find their way underneath. And if you think burrowing animals may be a problem, dig a 12-in.-deep trench around the perimeter of the garden. Then sink the fencing wire into the trench and backfill the wire on both sides. **PM**

TURN YOUR SPRINKLER INTO A GARDEN FEEDER.

FEEDS AS YOU WATER!
SAVES WORK!
SAVES TIME!

Sprinkler not included in sale.

USE IT WITH ANY SPRINKLER OR AS A HAND-HELD FEEDER.
USE IT FOR GARDENS AND LAWNS.
USE IT EVERYWHERE!

So versatile! You'll use it in many ways!

SOFT AND GENTLE SPRAY
For delicate flowers and seedlings.

HIGH VOLUME FAST FEEDER
For established trees, shrubs and lawns.

WAND FEEDER
For hard to reach hanging baskets and other plants.

FREE 1 lb of Miracle-Gro packed in each jar.

NEW!

MIRACLE-GRO® NO-CLOG™ 4-IN-1 FEEDER

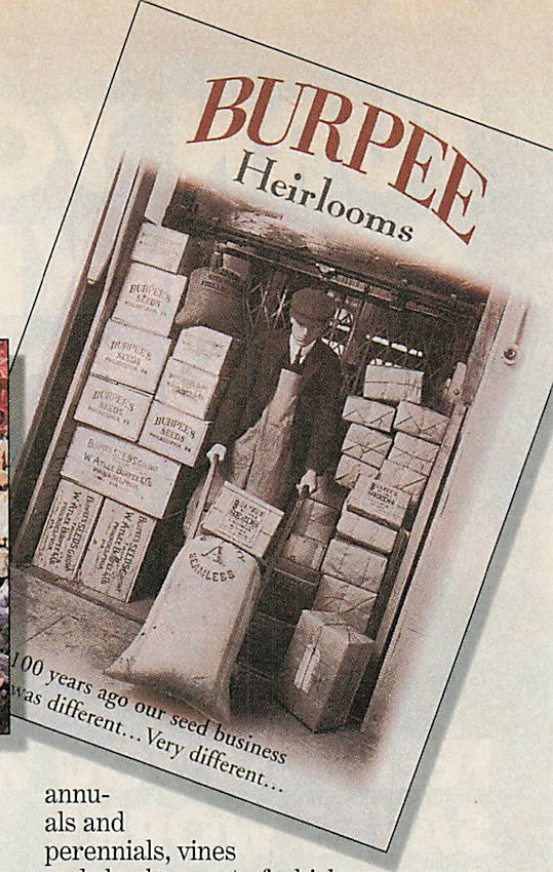
www.miracle-gro.com

GARDENING GUIDE

Gardening By Mail

Top-quality seeds and supplies are just a postage stamp away.

BY ROY BERENDSOHN, Associate Home Improvement Editor
PM Photos by Rosario Capotosto, Contributing Editor



Gardening catalogs expand your reach to plants, products and seeds that are unavailable through local sources. Just one catalog puts selections from dozens of horticultural experts at your disposal. You can try your hand at exotic flowers or heirloom vegetables, or plant herbs, a new type of tree or just about anything else that grows in your climate. Catalogs are also a great source for hard-to-find tools, gadgets and furnishings.

And, maybe the best part of all is that no matter what you order—or even if you order the same stuff year after year—there's nothing like thumbing through a gardening catalog to lift your spirits on a dreary winter day.

Johnny's Selected Seeds

This wonderful 137-page catalog emphasizes organic growing methods without making you feel like a criminal if you're not of a similar mind. It sells seeds for herbs, flowers, vegetables, melons, sunflowers, sprouts, ornamental grasses and grains in small packets or bulk bags. The catalog also sells books, tools and clothing. It may be small, but it's thorough. Flowers, for example, are marked for individual characteristics: ease of growth, cutting ability, suitability for drying, suitability for container gardening or greenhouse growing, fragrance, edibility and whether or not they're hybrids. Also, the catalog is fun. Take the section on bush dry beans. It includes several heirloom types, including one that the company found at a local seed swap. The bean itself came from Scotland. The catalog is free. Contact Johnny's Selected Seeds, Foss Hill Rd., Albion, ME 04910.

Burpee Seeds

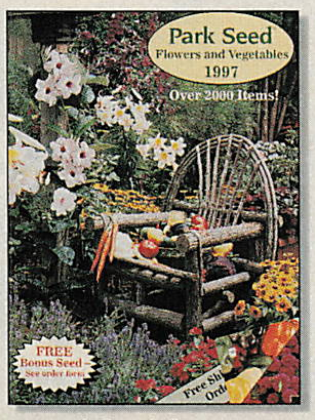
In business since 1879, Burpee is an American institution. Its heirloom seed catalog is nicely divided between vegetables and flowers, and both sections are fascinating. Heirloom seeds do not produce plants that are as disease-resistant or high yielding as their modern hybrid counterparts. On the other hand, they produce plants that are directly reproducible from their own seeds. Furthermore, these very old varieties of plants have tastes, textures and colors that have been lost through hybridizing. Consider the Dwarf Gray Sugar pea that has been offered in seed catalogs for 200 years. And then there's Burpee's famous Bush Lima, the seeds of which are descended from a single plant, a mutation that survived a cutworm-infested field in 1890. The fascinating stories just go on and on in this wonderful catalog: corn seed traceable to the Iroquois, a tomato called the Mortgage Lifter. It's more than a seed catalog—it's a lesson in horticulture from the time before written records to seeds circa 1947.

Both the heirloom catalog and the 123-page modern-seed-and-plant catalog, shown next to it, are free. Contact W. Atlee Burpee & Co., 300 Park Ave., Warminster, PA 18974; 800-888-1447.

White Flower Farm

Established in 1950, this company prides itself on a fine selection of annuals and perennials, vines and shrubs, most of which it produces in northern Connecticut. It ships its bulbs in bags or boxed, while plants are shipped in bare root form or potted. To get a sense for its attention to detail, consider that pot-grown

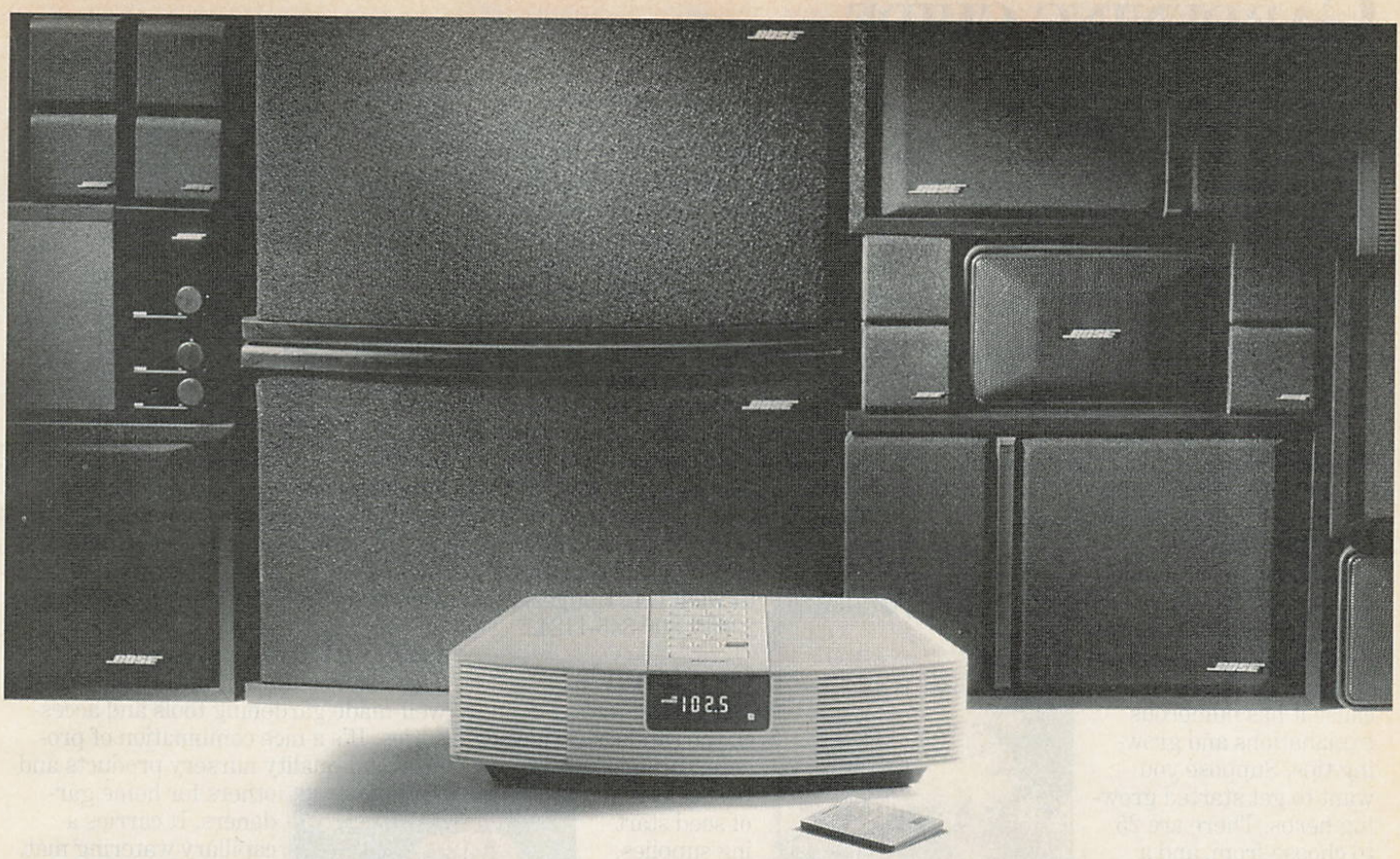
plants are shipped in five different sizes, ranging from 1-gal. pots for a dormant shrub to 2 × 3½-in. pots for tiny annuals. Its 130-page catalog is in an 8½ × 11-in. format, which allows for large, high-quality photos. This proves especially handy for viewing the catalog's unusual offerings, such as a white forsythia. The catalog is free. Contact White Flower Farm, P.O. Box 50, Litchfield, CT 06759.



Park Seed

After 129 years in business, the Park Seed catalog has earned the right to be called a gardener's classic. In 131 pages it presents a collection of thou-

(Please turn to page 118)



Our reputation stands behind it.

The Bose® Wave® radio is no ordinary radio. Behind it stands a 30-year reputation for building superior music systems and speakers that produce full, rich sound. But how do you get Bose quality sound from a small radio?

Technology that redefines radio.

The solution is our patented acoustic waveguide speaker technology. This technology is so advanced, it earned its creators the prestigious "Inventor of the Year" award. Much as a flute strengthens a breath of air to fill an entire concert hall, the waveguide produces room-filling sound from a small enclosure.

Even the critics were impressed. *Popular Science* called the Wave radio "a sonic marvel." *Radio World* called it "...a genuine breakthrough in improved sound quality." Turn it on and listen for yourself—you'll understand why many owners actually use their Wave radio as their primary music system. Yet the Wave radio measures just 4⅛"H × 14"W × 8¼"D, small enough to fit on a kitchen counter, bedroom nightstand, almost anywhere.

Remote-controlled convenience.

The easy-to-use Wave radio comes with a credit card-sized remote control that lets you operate the radio from across a room. You can preset six AM and six FM stations and switch between them at the touch of a button. Or listen to your favorite recordings by connecting the radio to your CD or cassette player, TV, or VCR. There's even a dual alarm feature.

Call now and make six interest-free payments.

The Wave radio is available for $349 directly from Bose, the most respected name in sound. So call 1-800-681-BOSE, ext. R7476, to learn more about our in-home trial and satisfaction guarantee. When you call, ask about our six-month installment payment plan. Or, if you prefer, return the coupon below.

So put a Wave radio in front of you. And hear all that stands behind it.

Order by June 30, 1998, for FREE shipping.

Call 1-800-681-BOSE, ext. R7476.

Please specify your color choice when ordering the Wave® radio: ☐ Imperial White ☐ Graphite Gray

Mr./Mrs./Ms. _____
Name (Please Print)

Address _____

City State Zip _____

( )
Daytime Telephone _____

( )
Evening Telephone _____

Mail to: Bose® Corporation, Dept. CDD-R7476, The Mountain, Framingham, MA 01701-9168, or fax to 1-800-862-BOSE (1-800-862-2673). Ask about FedEx® delivery service.

BOSE®
Better sound through research®

©1998 Bose Corporation. Covered by patent rights issued and/or pending. Installment payment plan and free shipping offer not to be combined with any other offer. Installment payment plan available on credit card orders only. Price does not include applicable sales tax. Price and/or payment plan subject to change without notice. FedEx service marks used by permission. Frank Beacham, *Radio World*, 12/93.

GARDENING GUIDE (Continued from page 116)

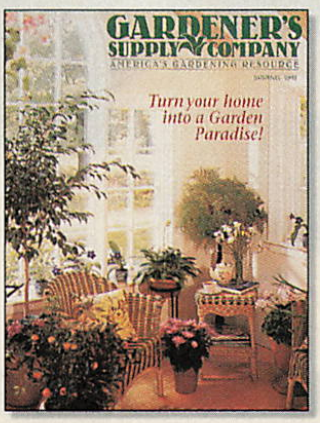
sands of items to choose from. You name it, it's in here, from ornamental banana to hydrangea to zinnia. In terms of vegetables and fruits alone, you have 70 to choose from. Its noteworthy selections include two pages of clematis, and it carries a 128-page book on the topic. It also carries a wildflower seed mix consisting of 16 types of flowers, specifically designed to attract birds such as cardinals, goldfinches and grosbeaks. The catalog is free. Contact George Park Seed Co. Inc., 1 Parkton Ave., Greenwood, SC 29647; 800-845-3369.

Harris Seeds

This no-nonsense catalog is a good fit for experienced gardeners because it offers a broad selection and for beginners because it has numerous explanations and growing tips. Suppose you want to get started growing herbs. There are 25 to choose from, and a free booklet on the topic. It contains four pages on the subject of sweet corn, and the best brief explanation on sweet corn genetics that we have seen. Also noteworthy is the attention the catalog pays to tomatoes (four pages long), seed starting supplies (six pages) and hot peppers (13 types). Several different types of pelletized seeds are listed. The catalog is no slouch with flowers and plants, either. About 86 categories are listed, and there are numerous entries within each category. Take impatiens, for example. They are well represented here in two pages, including a New Guinea variety from seed. The catalog is free. Contact Harris Seeds, 60 Saginaw Dr., P.O. Box 22960, Rochester, NY 14692.

Wayside Gardens

The Wayside catalog gives you a close look at its products. The high quality of its photography is particularly evident in the catalog's extensive rose coverage. In roughly a dozen pages, it offers a fine selection that ranges from hybrid tea types, such as Mr. Lincoln, to 19th-century shrub and Rugosa roses. David Austin roses are well represented, with 18 New English varieties alone and climbers such as Constance Spry are included, too. Also notable is the catalog's selection of rare conifers and some of the prettiest daylilies around. Finally, if your local garden center only carries a couple of ground covers like Pachysandra, then you'll enjoy the variety displayed in six pages here. The catalog is free. Contact Wayside Gardens, 1 Garden Ln., Hodges, SC 29695; 800-845-1124.

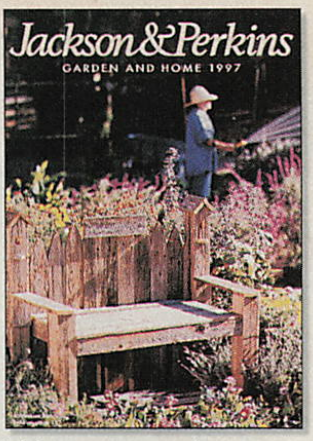


Gardener's Supply

Of the catalogs reviewed here, this one has the best selection of seed starting supplies, growing materials, plant stands and growing sundries. We particularly liked the Accelerated Propagation System. It consists of extruded polystyrene trays that are placed atop sheets of wicking material. Water is drawn into the growing tray by a separate water tray below. Clear plastic tops turn each tray into a miniature greenhouse. The trays insulate the tiny plants, which grow in small individual compartments filled with germinating mix. A variety of handy growing devices are present also. There are kits for making plastic-sheet row covers and plant covers for cold and wet growing conditions. Some of these products would otherwise be difficult to get without resorting to a professional nursery supply catalog. The catalog is free. Contact Gardener's Supply, 128 Intervale Rd., Burlington, VT 05401; 800-955-3370.

Jackson & Perkins

This is not a gardening or seed catalog in the sense of the others shown here. Instead, it deals with gardening as a state of mind. The products here are a means to decorate a yard and garden, turning it into a restful, idyllic retreat. There are garden statues and trellises, patio furniture and informal indoor furnishings, rugs and accessories like doorstops and message boards. The catalog is free. Contact Jackson & Perkins, P.O. Box 1028, Medford, OR 97501; 800-292-4769.

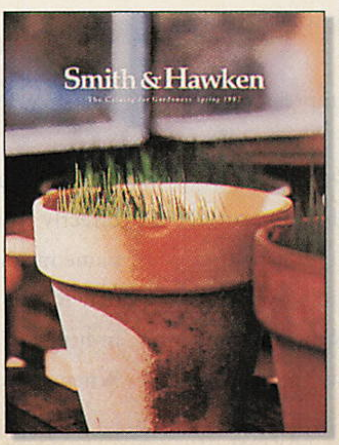


Lee Valley

This catalog offers a variety of sturdy, well-made gardening tools and accessories. It's a nice combination of professional-quality nursery products and others for home gardeners. It carries a capillary watering mat, and reinforced plastic film for cold frames, but also things like kitchen compost pails and hammocks. More than any of the other catalogs covered here, this one offers an excellent selection of books on a range of topics from flower arranging to botany. The catalog is free. Contact Lee Valley Tools Ltd., P.O. Box 1780, Ogdensburg, NY 13669.

Smith & Hawken

Leaf through this catalog and you could just as easily be browsing through a summer edition of a gardening and fashion magazine. The tone throughout is highly restrained and elegant. There are teak furnishings here, hand-forged trellises, galvanized metalware, English gardening tools, concrete benches, birdbaths and statues, ornaments in clay and casual clothing and rubber footwear. There are also a few pages of herb and wildflower seeds, bulbs and a selection of six David Austin roses shipped in pots. The catalog is free. Contact Smith & Hawken, 2 Arbor Ln., Box 6900, Florence, KY 41022; 800-776-3336. PM



FOR MORE

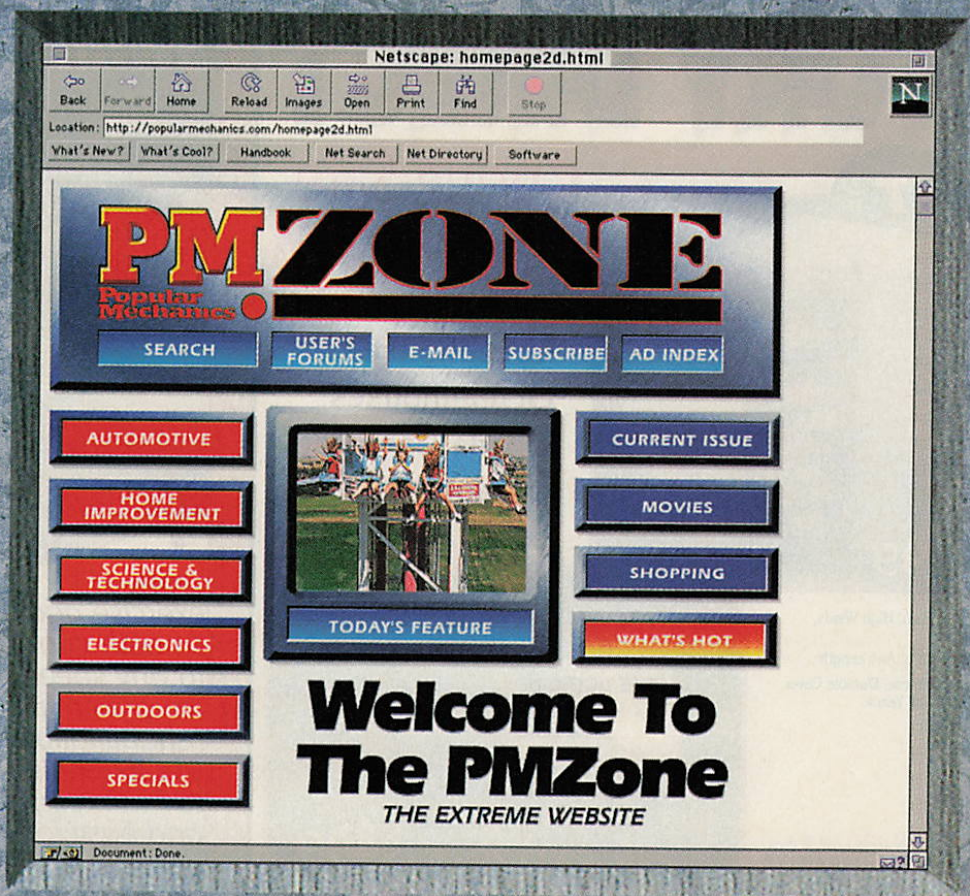
Popular Mechanics

log on to the

PM Popular Mechanics ZONE

http://popularmechanics.com

No other Web site offers the diversity, the amount and depth of hands-on information available on The PMZone. The PMZone's powerful search engine allows you to easily navigate through the entire site, giving you the information that interests you most:
New Cars • Home Improvement • Computers • Boats • Used Cars • Gardening
Home Electronics • Bikes • Car Care • Tools • Internet • Motorcycles • Motorsports
And the latest technology news from around the world.

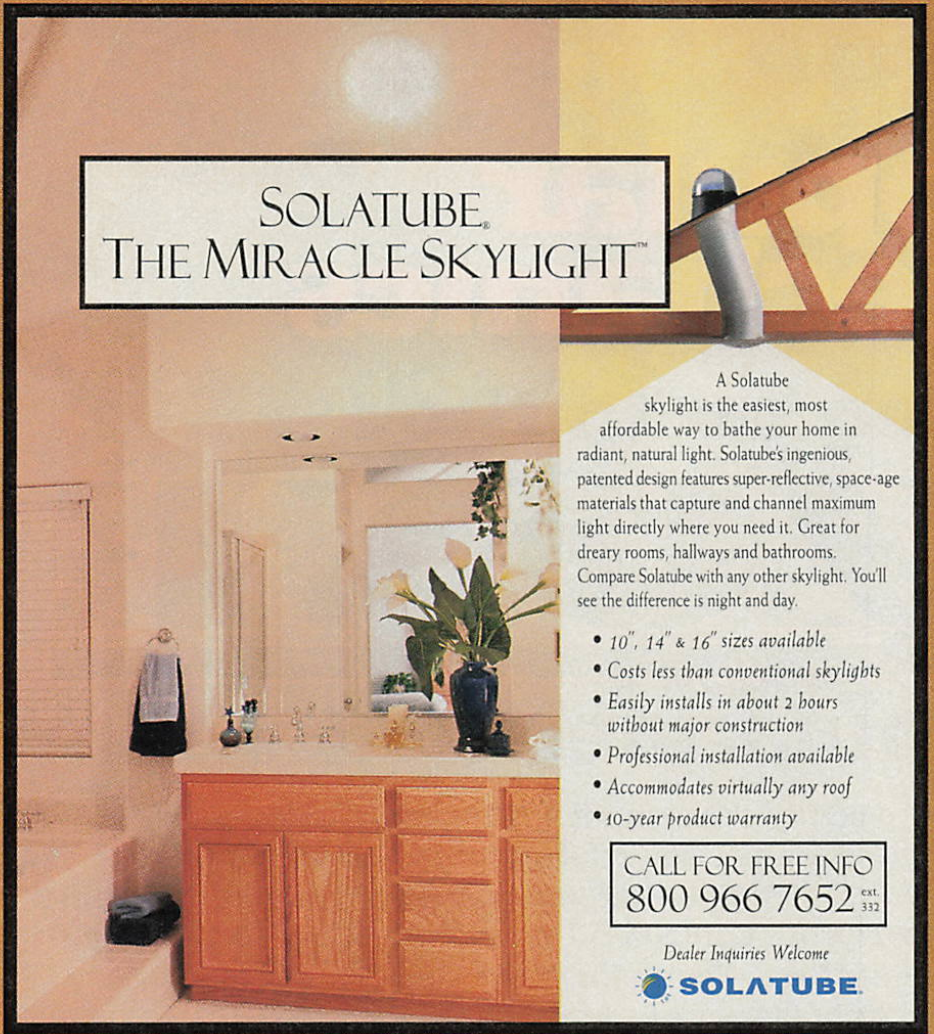


Check out the PMZone today.

For information about advertising and sponsorship packages on the PMZone, contact Bill Congdon, Associate Publisher, 212/649-3088, wcongdon@hearst.com

Home & Yard Mart

SOLATUBE® THE MIRACLE SKYLIGHT™



A Solatube skylight is the easiest, most affordable way to bathe your home in radiant, natural light. Solatube's ingenious, patented design features super-reflective, space-age materials that capture and channel maximum light directly where you need it. Great for dreary rooms, hallways and bathrooms. Compare Solatube with any other skylight. You'll see the difference is night and day.

- *10", 14" & 16" sizes available*
- *Costs less than conventional skylights*
- *Easily installs in about 2 hours without major construction*
- *Professional installation available*
- *Accommodates virtually any roof*
- *10-year product warranty*

CALL FOR FREE INFO
800 966 7652 ext. 332

Dealer Inquiries Welcome

SOLATUBE.

BUILD YOUR OWN PRAIRIE STYLE CABIN, STUDIO OR GUEST HOUSE

Build any size using 12' x 12', 144 s.f. module
144 s.f., 288 s.f., 432 s.f., 864 s.f. or larger
For complete plans & materials list
Send $29.95 check or m.o. to :

N.W. Fuchs Designs
207 E. Ohio St. #178
Chicago, IL 60611

LIVE LIKE THOREAU

FACTORY DIRECT

GROW IT™

Spring Sale
Save 40-50%

Greenhouses
Screenhouses
Shade Canopies
Garages

COVER IT

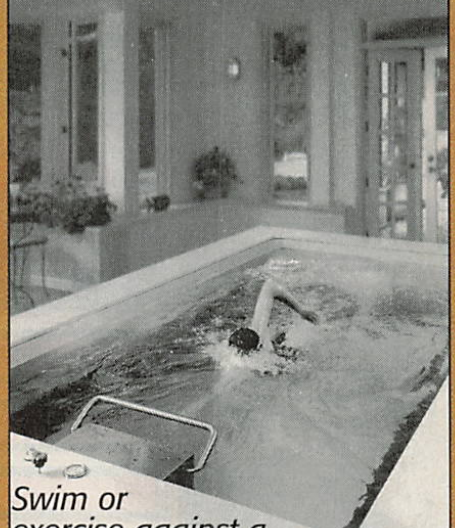
- Engineered to Withstand Ice, Rain, High Winds, Sun, Sap & Heavy Snow!
- Sizes from 5' to 60'w, up to 30'h, Any Length
- Heavy Duty Galvanized Steel Frame. Durable Cover & Zipper Door. Covers last to 20 Years. Easy Assembly & Anchoring!
- Dealers & Exporters Welcome
- Shipped to Your Door!

2 YEAR WARRANTY
30 DAY MONEY BACK GUARANTY*

EASY PAYMENT PLANS $25 A MONTH *Ask for details

Ext. 202G **1-800-932-9344** **Order Now**
203-931-4777 Fax: 203-931-4754 www.cover-it-inc.com

Swim at Home™



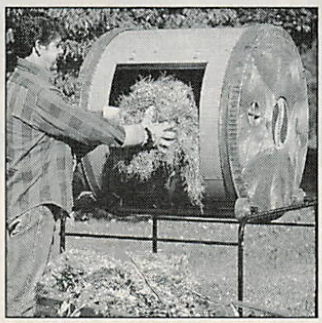
Swim or exercise against a smooth current adjustable to any speed or ability. Ideal for swimming, water aerobics, rehabilitation and fun. The 8' x 15' Endless Pool™ is simple to maintain, economical to run, and easy to install inside or outdoors.

Call (800) 732-8660
or visit www.endlesspools.com

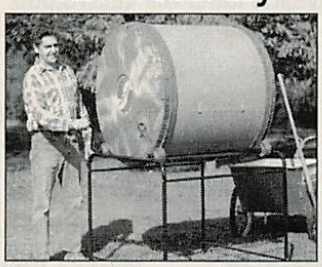
ENDLESS POOLS™
200 E Dutton Mill Rd, Dept P16
Aston, PA 19014

Compost In 2 Weeks!

Toss in your yard, garden and kitchen wastes.



Turn it each day.



Just 5 spins with the easy-to-turn handle.

In just 2 weeks take out your finished compost!

Why make compost any other way?

Guaranteed with our 30-Day Home Trial.

For more information call

1-800-880-2345

or mail the coupon below.

SPRING SALE - SAVE!

ComposTumbler®

160 Koser Rd., **Dept. 27048C,** Lititz, PA 17543

☐ **YES!** Rush me the information about the ComposTumbler, the 30-day home trial, and the Spring Sale.

Name _____

Address _____

City _____

State _____ ZIP _____

The choice of more than 200,000 gardeners!

©1998 PBM Group

You can drill your own water well!

PERFECT FOR IN-GROUND SPRINKLER SYSTEMS

Now you don't have to worry about tremendous water bills, droughts or water rationing. Since 1962, thousands of gardeners and homeowners around the world have discovered the **Hydra-Drill**™ secret. They drilled their own wells! You can too. Call or write us today and we'll send you a big, free package of information about drilling your own well with the **Hydra-Drill**™.

Ask about our "How To..." video!

Call Today for FREE Water Well Drilling Information Package

1-800-333-7762

Ask for Operator 8172

DeepRock 8172 Anderson Road Opelika, AL 36801-9700

www.deeprock.com

☐ **YES!** Send the **FREE INFORMATION PACKAGE** and the illustrated guide **HOW TO DRILL YOUR OWN WATER WELL**

Print Name _____

Address _____

City/State/Zip _____

Phone (must have) _____

© 1998 DeepRock

WOOD, WATER & FIRE

A RELAXING BLEND

Beautiful, hand selected cedar, still water and a gentle warming fire in your Snorkel stove are all you'll need to enjoy a relaxing soak, gazing at the evening stars in your Snorkel Hot Tub.

Affordable hot tubbing can become an every night pleasure. Once you have your tub... the evening stars are free!

Call for **FREE** information!

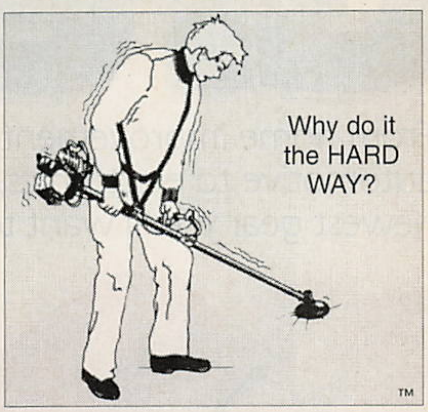
snorkel **hot tubs**

Snorkel Stove Company • Wood Fired Hot Tubs • Dept. PM 98YMZ
4216 6th Avenue South • Seattle, WA 98108 **www.snorkel.com**
800-962-6208

BROKEN SPRINKLER SPIKE?

The Lawn Anchor can stand up to your tough jobs. Made to be hammered into the hardest soils. Just put in your sprinkler head and you are ready to go. Fast and easy to use. Order your Sprinkler Spike by Priority Mail. **1** for **$4.95** or **2** for **$6.95** + $3 S/H. To order by Fax Call **1-800-500-4969** Give name,Address,Card No. Exp.Date or send Check/MO to: LAWN ANCHOR, Box 1210 Round Mountain, NV 89045. Call Now! Supply Limited! Web Site: www.netcom.com/~lawn1

TRIMMER USERS!



You'll LOVE

this totally new kind of TRIMMER ON WHEELS compared to the hassle of using a hand-held trimmer like the one above! The **DR® TRIMMER/MOWER™** rolls *light as a feather* on two BIG WHEELS! **TRIMS** better, far more precisely than hand-held trimmers. Plus, **MOWS** everything from whole lawns (even wet!) to tough waist-high growth with incredible ease! Rocks, roots, stumps, etc., do it no harm, because the DR® has no steel blade to bend, break, or dull! Perfect for use with riding mowers: takes the place of both your hand-held trimmer & small-wheels walk-behind mower for finish-up trimming and mowing. A delight to use!

*Please call or mail coupon below today for **FREE DETAILS** about the Revolutionary **DR® TRIMMER/MOWER™!***

TOLL FREE 1(800) 641-2244

YES! Please rush complete **FREE DETAILS** of the Revolutionary **DR® TRIMMER/MOWER™** including prices and specifications of Manual, Electric-Starting and Professional Models, and "Off-Season" Savings now in effect. There is no obligation.

Name _____

Address _____ PM

City _____

State _____ ZIP _____

To: **COUNTRY HOME PRODUCTS®**, Dept. 3619
Meigs Road, P.O. Box 25, Vergennes, VT 05491

©1998 CHP, Inc.

Great Stuff

From home improvement to outdoors, automotive to electronics, here's the newest gear you'll want to own.

APRIL

It's A Spout Time

You needn't be a precision bombardier to pour oil into your engine or antifreeze into your radiator without spilling it all over the place. This handy clip-on funnel attaches to both quart and gallon containers for spillproof fill-ups. It retails for under a buck at RV outlets, or contact Wirthco Engineering Inc., 6519 Cecilia Circle, Minneapolis, MN 55439; 612/941-9073.

First Off

The 23-watt Earth Light dimmable lamp is the first compact fluorescent that can be used in dimmable lights and daylight-activated photocell lights. It can also be used in motion-activated lights. Philips says the lamp will last 10,000 hours, or about five to seven years, in typical use. It produces roughly the same amount of light as a standard 90-watt bulb, and it can dim to 10% of its maximum light output, the company says. It costs about $25 at home centers. Contact Philips, 200 Franklin Square Dr., P.O. Box 6800, Somerset, NJ 08875; 800-555-0050.

More For Less

As computer prices begin to slope downward, Packard Bell wants to make sure you're getting quality—as well as a good price. Along with each new computer configuration, such as the Platinum 4500, come three Bonus Packs, called the Starter Pack, Power Pack and Support Pack. Although the Platinum 4500, the highest-end configuration, costs only $1899, it really packs a punch—with a 266-MHz Pentium II processor, 64MB of memory, a 6.4GB hard drive, 24X CD-ROM drive and 56Kbps modem. The Starter Pack helps novice computer users with software, while the Power Pack pumps up power, memory and speed. The Support Pack includes a virtual support technician to help prevent common mistakes, and AntiVirus software. Contact Packard Bell, 1 Packard Bell Way, Sacramento, CA 95828; 310/444-1310.

Temp Tamer

High underhood temperature in street and racing applications is not the hot setup for engine and electronic components. High-Velocity Exhaust Jackets insulate and block radiant heat while maximizing exhaust system performance. The jackets cover the individual tubes vertically and install with no need to remove headers. The jackets sell for $74 for 4- to 6-cylinder applications and $97 for 8-cylinder engines, from Thermo-Tec, P.O. Box 96, Greenwich, OH 44837; 800-274-8437.

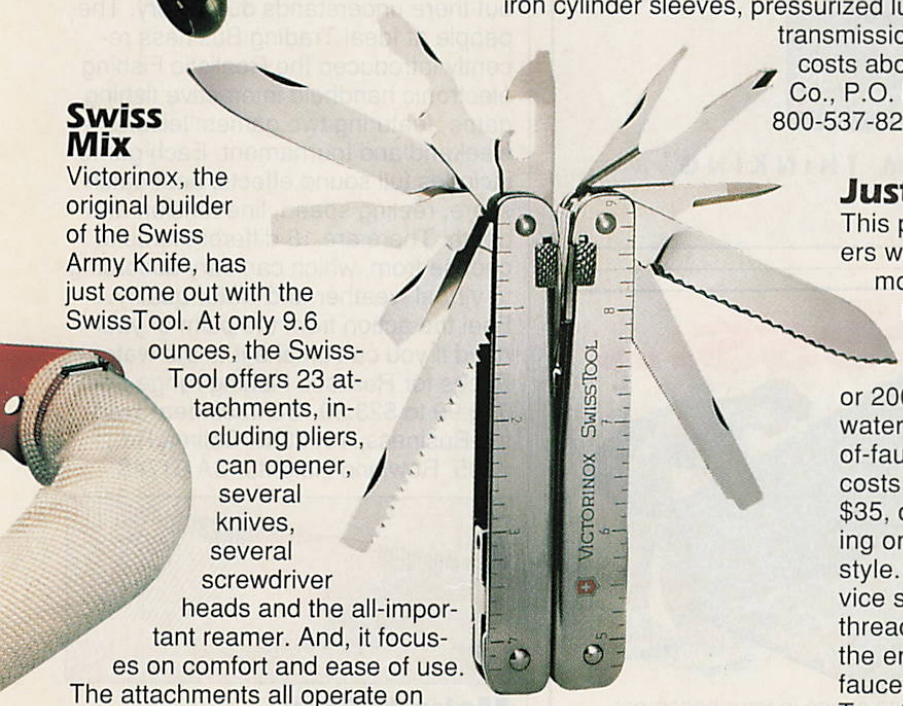
Deere Season

If your tractor barely finished last year's chores, consider John Deere's LT166 in your search for a replacement. The tractor is part of the company's new LT100 series, a product line consisting of three tractors ranging from 13 hp to 16 hp. The 16-hp model shown is equipped with the company's twin-blade Freedom 42-in. mulching deck. The deck is so named because Deere says it liberates homeowners from onerous deck cleaning and maintenance chores, and because its improved performance allows mulching across a wide range of conditions, from tall, damp grass to fallen leaves. The company says the deck cuts even tall, damp grass without producing clumps of clippings. Its inner surface stays clean because of a scouring action produced by the blades spinning in opposite directions and because of a smooth dome shape that is free of grass-trapping depressions. The upper surface is shielded so grass clippings are supposed to just blow off. The LT166 is powered by an overhead-valve 16-hp engine with cast-iron cylinder sleeves, pressurized lubrication and a dual-stage air cleaner. Its transmission is a foot pedal hydrostatic type. The tractor costs about $3100 at Deere dealers. Contact John Deere Co., P.O. Box 12795, Research Triangle Park, NC 27709; 800-537-8233.

Swiss Mix

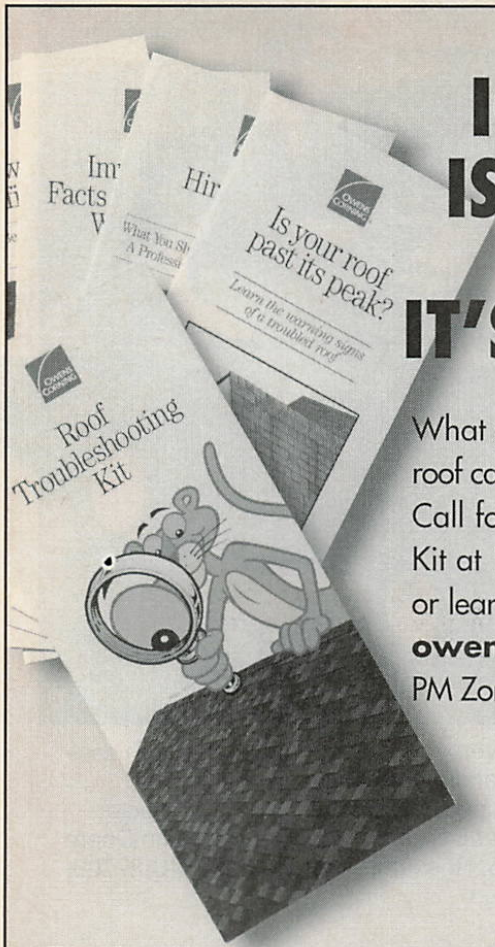
Victorinox, the original builder of the Swiss Army Knife, has just come out with the SwissTool. At only 9.6 ounces, the SwissTool offers 23 attachments, including pliers, can opener, several knives, several screwdriver heads and the all-important reamer. And, it focuses on comfort and ease of use. The attachments all operate on separate springs, so they open easily and lock in place. They also face outward, so you can pull out any item without having to open the pliers. And when you do open the pliers, the handle edges are rounded, so they won't dig into your hand when you squeeze.

You can find the SwissTool at outdoor and specialty stores throughout the country for $79. Contact Victorinox, 1 Research Dr., Box 874, Shelton, CT 06484; 800-243-4045.



Just Add Water

This product appears to be a good bet for homeowners who want an easy-to-install water filter that will remove lead, cysts, chlorine and sediment. The carbon-containing filter costs about $15 and lasts for three months or 200 gal. of water. The end-of-faucet valve costs $17 to $35, depending on the style. The device simply threads onto the end of the faucet spout. Turn the lever at its back to choose whether water will run through the filter or bypass it. It's sold at hardware stores and home centers. Contact Teledyne Water Pik, 1730 E. Prospect Rd., Fort Collins, CO 80553; 800-525-2774.



IGNORANCE IS NOT BLISS.

IT'S EXPENSIVE.

What you don't know about your roof can cost you. Is yours in trouble? Call for our free Roof Troubleshooting Kit at **1-800-GET-PINK, ext 2026** or learn about roofing online at **owenscorning.com** or on the PM Zone at **popularmechanics.com**

OWENS CORNING

SYSTEM THINKING™

19-RR-22540 Copyright © 1998 Owens Corning.
The color PINK is a registered trademark of Owens Corning.
System Thinking is a trademark of Owens Corning.
TM & © 1998 United Artists Pictures Inc. Licensed by MGM Consumer Products.

Easy Access...

to more living space...

with a BILCO Basement Door

© 1994, The Bilco Company

Enjoy easy access to recreation, hobby and storage space in your basement with a Bilco basement door. Constructed of durable, heavy gauge steel, the Bilco door features smooth, easy operation, automatic hold-open safety latches and sturdy, concealed hinges for lasting, trouble-free service. Bilco is America's choice for basement access. Available at leading building materials and home center dealers.

NEW! Keyed Lock Kit Available

Bilco®

AMERICA'S FINEST BASEMENT DOOR

yes, I want more information on...

☐ Replacing my present door. Sloping sidewalls are: ☐ wood ☐ masonry
☐ Adding outside basement entrance to a home.
☐ New home or addition to be built. (Please Print)

Name _____

Address _____

City _____ ST _____ Zip _____

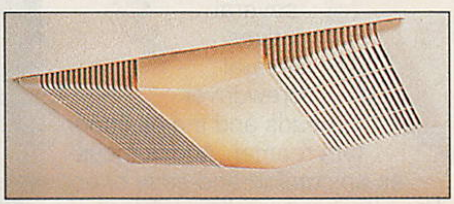
The Bilco Company, P.O.Box 1203 New Haven CT 06505

PM-48 **http://www.bilco.com**

NEW PRODUCTS

Fishing For Reality

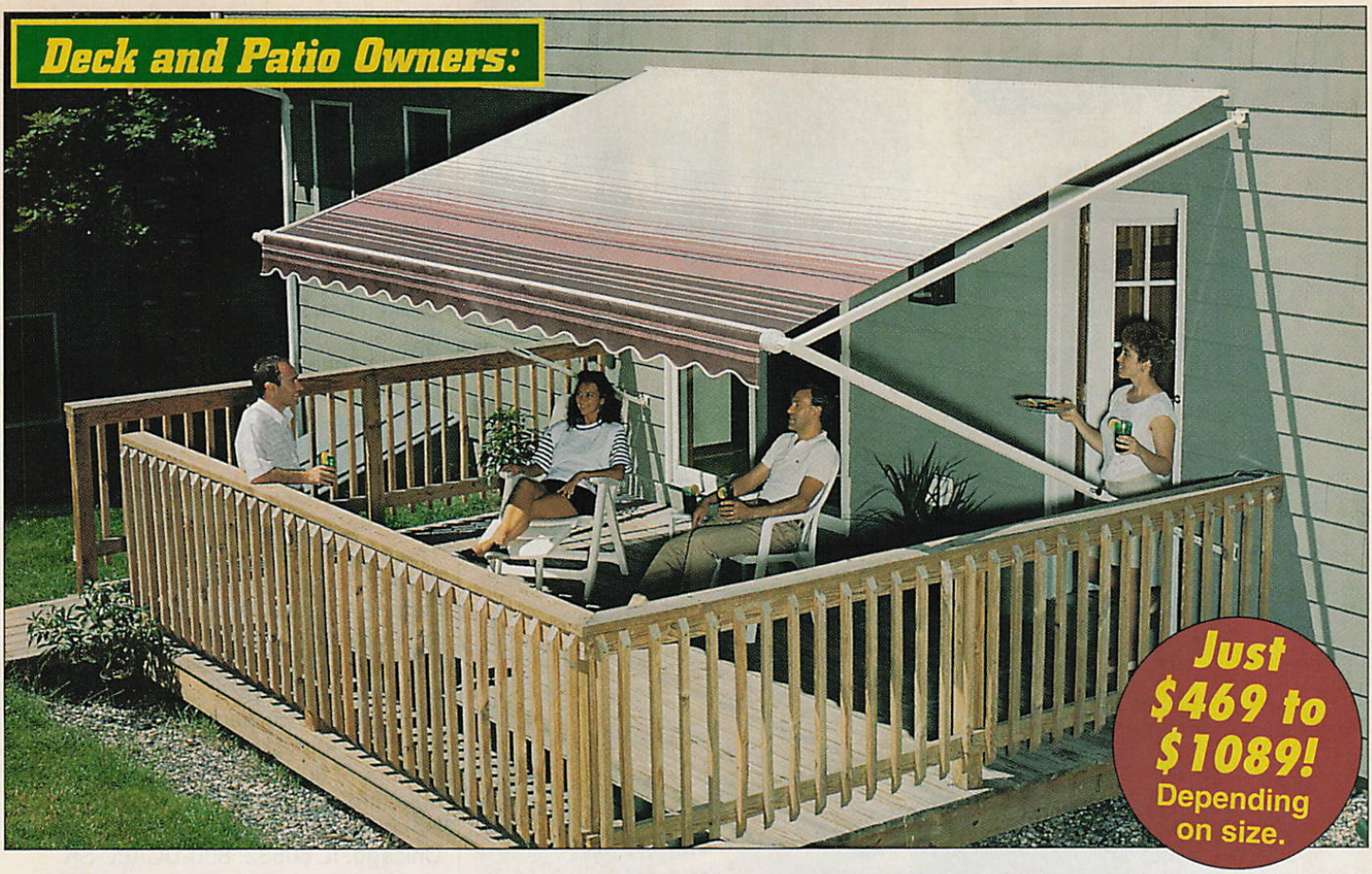
Sometimes we just can't get out on the boat for that weekend fishing trip we've been looking forward to, but somebody out there understands our misery. The people at Ideal Trading Business recently introduced the Realistic Fishing electronic handheld interactive fishing game, featuring two games: leisure/weekend and tournament. Each game includes full sound effects, best-catch score, reeling speed, line tension and depth. There are 18 different lures to choose from, which can vary according to virtual weather and water quality. Feel the action from the palm of your hand if you can't make it to the water. Prices for Realistic Fishing range from $19.99 to $23.99. Contact Ideal Trading Business, 19726 E. Colima Rd., #305, Rowland Heights, CA 91748.



Make It Easy

Remodeling a bathroom is no easy job, so you might want to consider NuTone's combination heater, ventilator and light as a way to simplify the mechanical end of things. The device fits in a 2 × 6-ft. ceiling, and the company says it is easier to install than previous models because its hanger bar has 4-way adjustment. It also has color-coded wiring, and mounting clips that speed its installation. Once installed, it provides 1500 watts of heat, a 70-cfm exhaust fan and 100 watts of illumination. It costs in the $125-to-$150 range at home centers and building supply houses. Contact NuTone Ventilation Products, Madison and Red Bank Roads, Cincinnati, OH 45227; 800-543-8687.

(More New Products on page 126)



Outsmart the Weather!

With a SunSetter® Retractable Awning, you can choose full sun, partial shade or total protection from rain or sun...

Now get three times the use of your deck with the adjustable, affordable SunSetter Awning. It makes your deck or patio like an additional room on your house! Lets you enjoy your deck or patio rain or shine. Protects your family, guests and patio furniture from rain, harsh sun and harmful UV rays far better than a tippy patio umbrella. Adds to the beauty and value of your home. Expertly crafted in America for years of maintenance-free enjoyment.

Opens and closes with ease in 30 seconds!

SAVE WITH FACTORY-DIRECT PRICING!

- **100% waterproof fabric.**
- **Wide choice of available widths.**
- **Installs over any kind of siding.**
- **Retracts flat against the house.**
- **No need to take it down in winter.**
- **Superb quality — 5 year warranty.**
- **No-Interest payment plans available.**
- **No-Risk Free Trial.**

SunSetter®

The Retractable Patio & Deck Awning

Call Toll Free: 1-800-876-8060 for a FREE VIDEO

Ext. 4481

Fax 781-321-8650. Or mail this coupon today.

❑ **YES**, please send me your FREE video, plus FREE information on SunSetter Awnings, including your factory-direct pricing and interest-free payment plans.

Name_____

Address_____

_____

City_____ State_____ Zip_____

JIL Industries, Dept. 4481, 184 Charles Street, Malden, MA 02148

POLE•WRAP™
The Best Solution for Finishing Basement Poles!

Put the finishing touches on your basement poles, with Pole•Wrap!

Made of premium red oak veneer, Pole•Wrap will enhance any basement's appearance.

Easy to Install
Premium Red Oak
Instant Beauty
Get Yours Today

Call!
1.800.241.POLE
For your local source

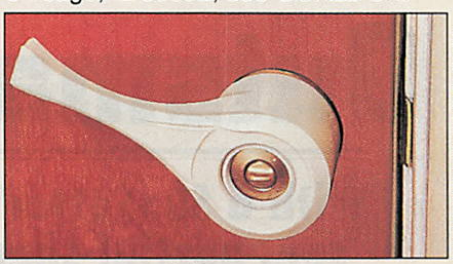
Order by Mail!
1.800.331.1261
HOME

Also available at:
Mills Fleet Farm
Beaver Lumber

VISA DISCOVER MasterCard

Rap Star

When all else fails and you have to break out the big hammer for those hard-to-reach fasteners, make sure your impact sockets are up to the job. Unlike cheap imports that fall apart like an Asian economy, SK's U.S.-made, premium alloy steel 3/8-in. Drive Deep Swivel Impact Sockets, available in metric and fractional sizes, really stand up. The sockets feature more interior depth to accommodate taller fastener heads. The independent ball-swivel joint design allows the socket to turn freely without binding at tight, offset angles. And the socket drives the sides, not the corners, of the fastener. Available individually for $14.95 or in sets for $100, the sockets are available through tool outlets. Contact SK Hand Tool Corp., 3535 W. 47th St., Chicago, IL 60632; 800-UCALL-SK.



PM PHOTO BY ROSARIO CAPOTOSTO

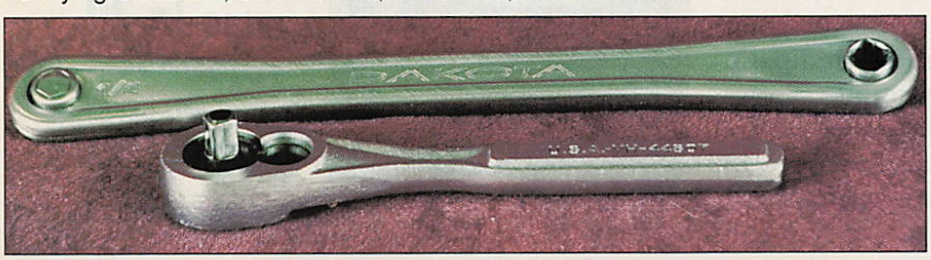
Increased Leverage

Everyone can use a hand every once in a while. Suppose you want to open a door but your hands are greasy and dirty, or you're holding something heavy using both hands. If you have arthritis, it's tough to turn the knob. Leveron is a plastic lever that fits over an existing knob. It grips the knob with nonslip gaskets. It's available in almond, brass, silver, bronze, bright red and glow-in-the-dark finishes. It costs $13, plus $3 for shipping. Contact Lindustries Inc., P.O. Box 66295, Auburndale, MA 02166.

NEW PRODUCTS *(Continued from page 124)*

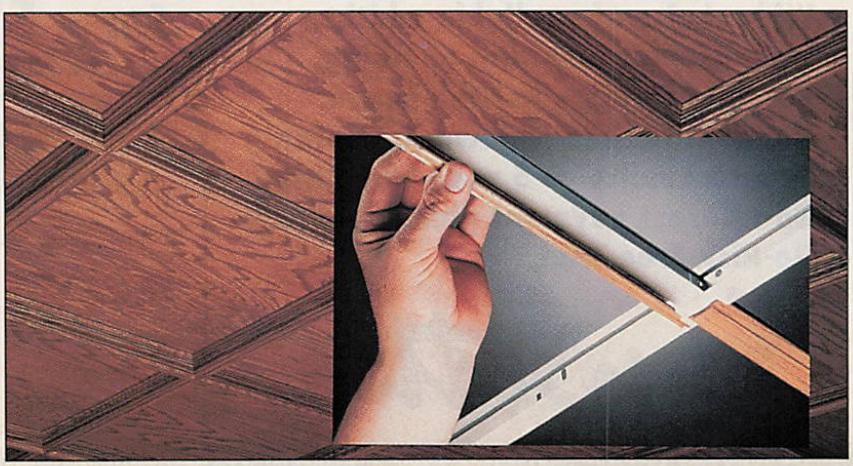
J-Turn

J-Wrench is an alternative to removing half your engine to get to an inaccessible fastener. To use this unique tool, you attach one end of the J-Wrench to the fastener, and use a drill, air ratchet or hand ratchet on the other end. The tool's internal sprockets rotate to remove the fastener without any ratcheting motion of the J-Wrench itself. The average cost of a J-Wrench is $55, from Dakota Tools, 10 Flying Cloud Dr., Summerville, SC 29483; 888-597-3624.



Discussion Panel

You can convert a suspended ceiling into a wood-paneled ceiling with these panels and snap-on grids. The panels are 2 × 2 ft. or 2 × 4 ft. and are either flat, or recessed 1/2 in. or 1 3/8 in. The panels consist of oak veneer over medium-density fiberboard. The veneer is protected by a clearcoat. The grids are solid oak and snap in place over the existing grid. To do a 12 × 12-ft. ceiling would cost about $1.40 per sq. ft., or about $200. The panels and grids are sold at home centers and lumberyards. An estimating and installation guide is available. Contact Chicago Metallic, 4849 South Austin Ave., Chicago, IL 60638; 800-323-7164.



(More New Products on page 128)

MONEY BACK GUARANTEE!

Sleep Better On Air!

"After 15 years of sleepless nights and waking up to back pain, we both can finally say AHHH in the morning and smile."

–Marc P., Brooklyn, NY

90-NIGHT IN-HOME TRIAL!

Patented Air Chamber Design!

Adjustable Firmness For Each Of You!

Now you really can personalize your own mattress firmness and comfort... and so can your partner!

The SELECT COMFORT® sleep system's revolutionary air chamber design supports each of you on your own individual cushion of air...with completely adjustable firmness for both of you! That means you can have rock hard firmness on your side while your partner sleeps on feather bed softness...all in the same mattress!

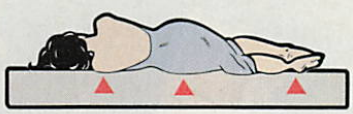
Plus...it's so easy to adjust you can change the firmness at any time! Go from extra firm to extra soft at the simple touch of a button.

The Mattress With Easy Push Button Firmness Control!

uncomfortable pressure points. Tests show it also helps properly support your back and spine. And that reduces tension in the surrounding muscles. So you can sleep comfortably in almost any position... and wake up feeling great!

Makes Metal Coils OBSOLETE!

SELECT COMFORT® sleep systems comfortably contour to your body, properly support your back and spine, and reduce pressure points.



Metal coil mattresses can create uncomfortable pressure points and provide uneven support over time.

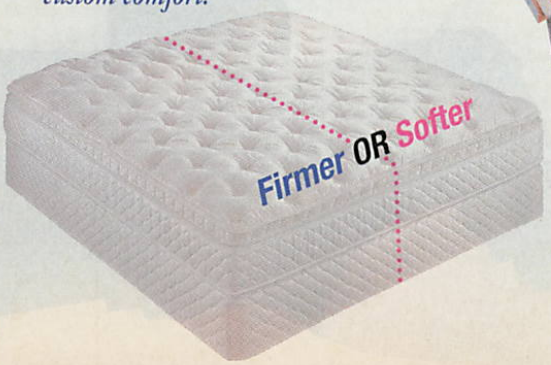
You'll Sleep Better On Air!

A Select Comfort Sleep System doesn't rely on springs or water. Instead it supports your body on a cushion of air. Air gently contours to your body's shape, reducing

Call Today for FREE Details!

You owe it to yourself to learn more about this revolutionary way to a better night's sleep!

With patented dual firmness controls, you can each select your own custom comfort!



For a FREE VIDEO and Brochure, call:

1-800-831-1211 Ext. 6418

Yes! Please rush me a FREE Video and Brochure.

Name_____

Address_____

City_____ State_____

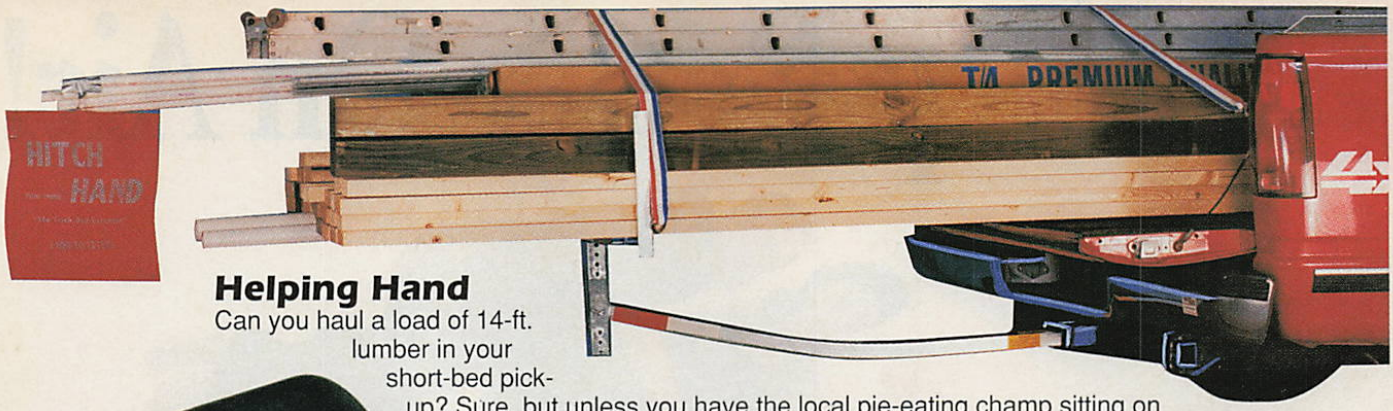
Zip_____ Phone_____

Ext. 6418

SELECT COMFORT®

Select Comfort Direct Corporation
6105 Trenton Lane North, Minneapolis, MN 55442

© Select Comfort Direct Corp., 1998



Helping Hand

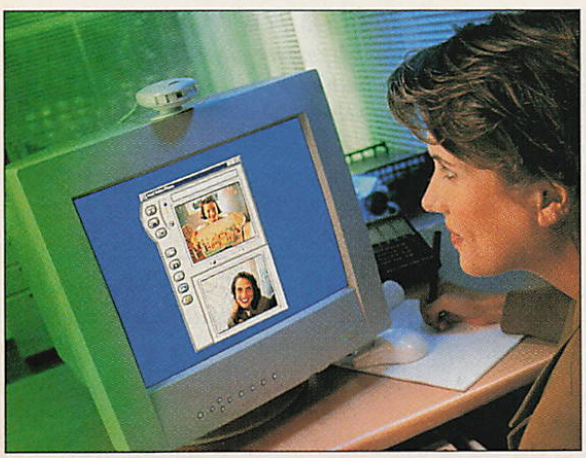
Can you haul a load of 14-ft. lumber in your short-bed pickup? Sure, but unless you have the local pie-eating champ sitting on your wood, the first dip or bump dumps your load all over the street. Hitch Hand is a great alternative to risking a king-size game of Pick-Up-Sticks. The truck-bed extender fits in your 2-in. receiver hitch and extends 43 in. behind the lowered tailgate when in use. The arm adjusts to a maximum width of 49 in. and will support more than a ½-ton pickup's max rated payload. Hitch Hand sells for $229 from Happy Hollow Inc., 2185 Goreville Rd., Goreville, IL 62939; 800-863-9836.

Hard Hitting

You can convert any ⅜-in. or larger drill into an impact driver with this accessory from Jacobs. It's called the Assault Impact Drive. You simply chuck it into your drill—there's no need to modify the tool. The driver converts the drill's rotation into impact rotation that varies with the drill's speed. It's designed to operate at drill speeds between 400 and 1500 rpm using ⅜-in. impact sockets or a standard ⅜-in. to ¼-in. hex adapter for driving wood screws. The chuck costs about $30 at hardware stores and home centers. Contact the Consumer Affairs Dept., Danaher Tool Group, Professional Division, P.O. Box 3767, Lancaster, PA 17504.

Central Heating

It makes sense that a company with the name Central Boiler would come up with this idea: a free-standing gas fireplace that also serves as a boiler. The appliance is called the Millennium 2100, and it can be plumbed into a hot-water heating system or act as the heat source for domestic hot water. It produces 70,000 BTUs per hour, and it vents directly to the outside. Its automatic ignition is thermostatically controlled. This eliminates the need for a pilot light or for you to monitor the appliance's performance—it turns on and off based on the ambient temperature. The Millennium runs on propane or natural gas. It costs about $3700 plus installation. For the nearest dealer, contact Central Boiler Inc., Route 1, Box 220, Greenbush, MN 56726; 800-248-4681.



Picture Perfect

Give yourself the freedom of PC visual communications with Intel's Create & Share Camera Pack. It's a photo- and video-editing package that plugs into Pentium processor-based high-performance PCs—and it's fun for everyone who likes to play with pictures. The pack includes an Intel PC camera, hardware and an integrated suite of communications and image-editing software. You'll be able to make, enhance and organize snapshots and videos that can be passed along to others. The package includes the Intel Video Phone with ProShare technology. Three different versions are priced from $199 to $399. Contact Intel, 2200 Mission College Blvd., RN5-11, San Jose, CA 95056; 602/554-2522.

Watch Out!

Tired of yelling "watch your back" or being ignored by traffic every time you strap on your inline skates? Then check out ArmAlarm Sport.

This small gadget straps to your wrist and lets out a 120-dBA alert at the touch of a button. That should be enough to get the attention of inattentive pedestrians and drivers alike.

The ArmAlarm also features a digital wristwatch with time and date displays. A stopwatch mode provides lap times and total elapsed time for those who like to keep a steady pace.

A low-battery indicator lets you know when to change the 12v, A-23 battery for the alarm and the button cell battery for the watch. You can find the watch at select sporting goods stores for $19.95, which includes a standard wristband and a band that fits over a wrist guard. For more information, call ArmAlarm Inc., 1017 W. Glen Oaks Ln., Suite 204, Mequon, WI 53092; 800-475-1305.

(More New Products on page 131)

Bed-Time Story

Truck bed liners are the way to go to protect your pickup bed against dings, dents and rust. But liners can be a bit pricey. Durabak is a great alternative—a very durable protective liner that you apply yourself with a brush or roller. It can even be applied directly over rusted surfaces. Available in a variety of colors, Durabak is waterproof and oil-, chemical- and UV-resistant, and it cures when exposed to air. One gallon costs $99 to $140 and covers 60 sq. ft. Durabak is available directly from Cote-L Distribution Co., 4064 Atchison Way, Suite 301, Aurora, CO 80014; 303/690-7190.

French Kicks

Sure it's spring, but a nasty late-season storm can still turn your hike into a snowy slog. Based in the French Alps, TSL knows that as well as anyone. That's why the company builds lightweight snowshoes that are easy to take along.

Injection-molded polypropylene makes them strong as well. Steel crampons provide traction on icy or hard-packed snow and fins help you stay balanced while walking in deep powder. Four different frame styles and three different bindings accommodate a wide variety of users and a number of applications, ranging from hill climbing to ice walking.

The shoes, available at outdoor specialty stores or directly from the company, range from $54.99 to $154.99. For more information, contact TSL Snowshoes, 925 N.W. 19th, Suite E, Portland, OR 97209; 888-782-2228; www.tslsnowshoe.com.

Space Race

According to Rubbermaid, the Slide-Lid shed is 92 cu. ft. of storage facility that you can assemble in about 10 minutes. It's big enough, and its floor is designed to be rigid enough, to handle a small rear-engine riding mower. And it's built from foam-filled plastic panels that are made to resist most farm and lawn chemicals. The insulated nature of the design also helps keep it from forming condensation inside. Its front roof panel locks to the swinging doors, and when it's unlocked you simply slide the panel over the one behind it. The shed costs about $350 at hardware stores and home centers. Contact Rubbermaid, 1147 Akron Rd., Wooster, OH 44691; 800-643-3490.

The Splice Of Life

You need one long line to tow someone into port, but you have only two short lines. You should tie them together with: a) a square knot; b) a sheet bend; or c) a rolling hitch?

The answer could be: d) the Magnum Splice Master. This unique new device allows any landlubber to secure line connections without ever tying a knot. You just lay the two lines parallel to each other, wrap them around the Splice Master up to eight times and pull them through the eye on each end. Since it uses the force of the line pulling against itself, the Splice Master creates a slipfree connection that holds tighter as more force is applied.

The $1.99 item is great for extending your anchor line, securing mooring lines, towing, and making large, no-slip loops. It can safely secure two lines of different thicknesses. You can buy the Splice Master directly from the company: No Knots!, Box 1790, Warren, PA 16365; 814/726-9559.

Double Vision

Wearing a dive mask is a little bit like wearing blinders—you can only see straight ahead. That is, until now. Mares' new Esa Tech Black mask is the world's first 6-lens mask. Carefully positioned side- and downward-facing lenses allow you to see in all directions.

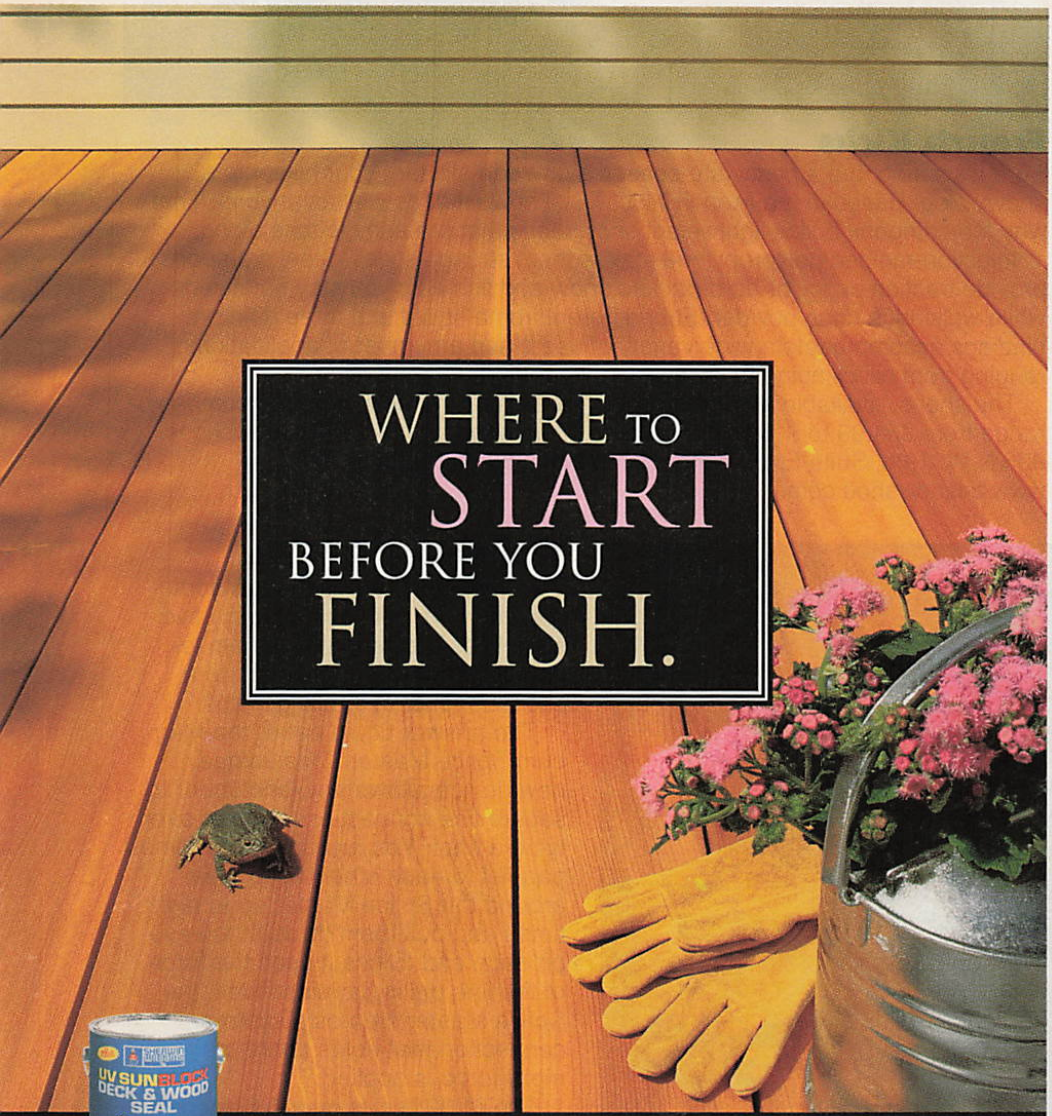
The downward-facing lenses are particularly useful to divers since they allow them to check instruments, straps and equipment without breaking out of a streamlined swimming position. Prescription lenses can turn the mask into the underwater equivalent of bifocals, with the main lenses adjusted for distance and the downward lenses for up-close viewing.

The $139 mask features liquid silicone and tempered glass, so it weighs just 9.63 ounces. The extra-wide strap ensures secure placement and offers a quick-release buckle. It can be found at most dive shops. Contact Mares, 1 Selleck St., Norwalk, CT 06855; 800-874-3236.

Hot News

Let's talk about unplanned expenditures for a moment. One day your boiler is this perfectly serviceable gray box in the basement, and the next day your plumber tells you it's useful only as scrap metal. Then comes the kicker. The chimney is shot too. Take a deep breath and consider Burnham's direct-vent boiler. It doesn't need a chimney because it sends exhaust gas out a flexible metal vent through an outside wall. To prevent the hot gas from staining or damaging the siding, the vent cap projects 9 in. away from the siding, and it allows air to thoroughly dilute the exhaust from all sides. A separate pipe with a down-facing elbow takes in combustion air. The boiler comes in sizes from 74,000 to 143,000 BTU. The installed cost is typically in the $5000-to-$6000 range, depending on size and other features that may be needed to upgrade your house's domestic hot water and heating system. The boiler is sold through Burnham dealers. Contact Burnham, P.O. Box 3079, Lancaster, PA 17604.

(More New Products on page 134)



Your Sherwin-Williams store is the right place to start before you finish, or refinish your deck. You'll get the expert advice you need. You'll also find the complete line of Cuprinol® deck care products to clean, stain and preserve your deck, keeping it beautiful for years. So before you finish your deck, start at the right place, your Sherwin-Williams store. Call 1-800-4-SHERWIN (1-800-474-3794) for a store near you.

When only the best will do.
Ask Sherwin-Williams.™

SHERWIN WILLIAMS
PAINT, STAIN AND WALLPAPER STORES

© 1998 The Sherwin-Williams Company.

Authentic Collectible Officially Licensed By Lionel LLC

All Aboard The Lionel® Collectible Train Watch!

AS SEEN ON TV

For Only $19.95

- Precision Quartz Movement!
- Moving Train Second Hand!
- Amazing Lifelike Train Sounds!
- Genuine Leather-Lined Strap!
- Layered 18K Gold Tone Case!

Includes A Handsome, Full Color, Nostalgic Carry Case!

Time And Time Again People Will Ask...

"Where on earth did you get that incredible watch?"

Just imagine a collectible watch that's so unique, it will catch the attention and admiration of everyone who sees it! This intricately detailed, Lionel® Collectible Train Watch features a brilliant goldtone case, a rich brown leather-lined strap and a moving train with lifelike sound, making it the most appealing watch you'll ever own!

A Great Way To Honor The Mighty Rails!

Whether you're talking about the first steam locomotive built in 1803 or about today's most luxurious passenger trains, the rail system is considered a very important part of our history ...and our future! Now this rare Train Watch, one of the newest members of the legendary Lionel® family, featuring moving parts and lifelike sounds will bring you back to the days of the mighty rails.

So Much More Than A Timepiece- A Lionel® Keepsake!

To train lovers, there are few methods of transportation that can match the wonder and glory of a train. And to train collectors, Lionel® is a name that stands for uncompromised quality and innovation. Lionel®, whose inspirational and historic collectibles have created a rich, rewarding collectors experience for almost 100 years, truly understands the beauty of a train as it glides so smoothly along the tracks. The marvelous sound of the whistle blowing announcing its entrance and exit. Even the excitement and suspense that builds while waiting for that speeding flash of silver to pass through the station as you watch from your car. Now, Lionel® has made these exciting moments and sensational sounds available for you to enjoy any time!

Accurate And Exciting!

The Lionel® Collectible Train Watch captures the wonder of a train with every passing minute! Watch as the train glides around the hands of the watch, and with a simple push of a button, hear a full spectrum of sounds like the train chugging on the tracks, blowing its whistle and the ever familiar clanking sounds of a railroad crossing! Most importantly, the moving train watch features contemporary accuracy - something you can count on for years to come!

Satisfaction Guaranteed!

We guarantee that you'll love the historic charm and exciting movement and sounds of this Lionel® Collectible Train Watch or your money back (less shipping & handling).

http://www.telebrands.com

Mail By May 6th For This Amazing Offer!

YES! Please rush my Train Watch(s) indicated below:

☐ One watch for **$19.95** plus $4.00 Shipping & Handling.
☐ Two watches for **$39.90** plus **FREE** Shipping & Handling.
☐ Add just $4.95 to ship your order by **Priority Mail.**

Total Enclosed $_____. VA res. add 4.5% sales tax.

Payment Method: (Check One) ☐Check ☐Money Order ☐Visa ☐M/C ☐Amex ☐Diners ☐Discover ☐Carte Blanch

Card # _____ Exp. Date ____ / ____

Name _____

Address _____ Apt. _____

City _____ State _____ Zip _____

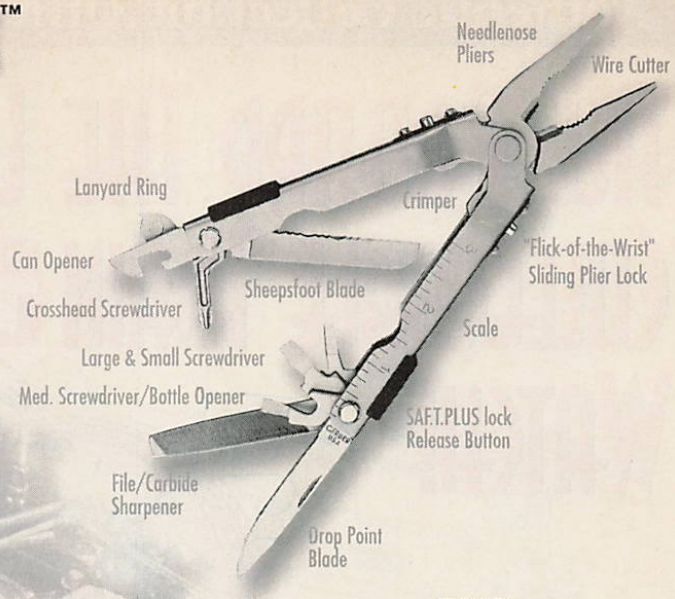
Mail To: Authentic American Collectibles, Dept. LT6395 One American Way, Roanoke, Virginia 24016

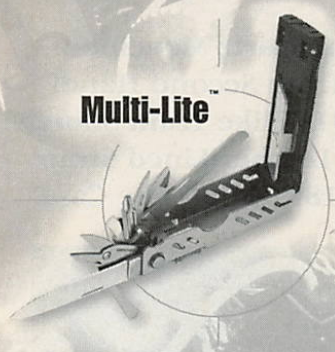
©Telebrands 1998.

Gerber® Multi-Lock™

Fully Locking Components
One-Handed Opening
Bluntnose Version Available
Accepts Gerber® Tool Kit

Gerber® has the most extensive line of knives and Multi-Function tools available.





Emergency Light & Fiskars® Scissors

Fiskars® Scissors & Locking Components

1 Handed Opening & ATS-34 Blade

PROUDLY MADE IN USA

GERBER® LEGENDARY BLADES

14200 SW 72nd Ave.
Portland, OR 97223
Attn: Cust. Service - PM

NEW PRODUCTS *(Continued from page 132)*

Sounds Of Sleep

Relaxing can be a tough business. Especially if you live by a noisy highway or in a city. Fortunately, Body Basics by HoMedics has a solution. The Sound Spa Clock Radio can help create the perfect environment. Fall asleep to one of six calming sounds, such as "ocean," "summer night" or "spring rain." And wake up to any of the sounds, the radio or the unit's alarm. Sound Spa uses "sound conditioning" to improve relaxation, with the theory that everybody responds well to the repetitiveness of natural sounds. Contact Body Basics by HoMedics, 2240 Greer Blvd., Keego Harbor, MI 48320.

A Logical Extension

The Romex extension cord is designed to be tough from the tip of its pins to the end of its receptacle. Starting at the pin end, a plastic reinforcing plate is inserted between the ground pin and the blades, and then the PVC-plastic body is molded around it. This reinforcement is designed to keep the pins straight even under tough use. The cord uses a tougher grade of PVC than is typically found in these products, and because filler strips have been omitted, you get a jacket that is thicker and more flexible, says the company. At the other end, the contacts in the receptacle have larger-than-typical surface area to ensure the best possible electrical connection. Finally, the cord's 13-amp rating is molded into the plug as a reminder. It comes in a 100-ft. length, and it's backed by a lifetime warranty. It costs $20 to $22 at hardware stores and home centers. Contact General Cable, 4 Tesseneer Dr., Highland Heights, KY 41076.

New Hope For The Dead

If you think your dead, sulfated 12-volt battery is only good for some toxic landfill, think again. Unlike conventional trickle chargers or battery "maintainers," PulseTech Solargizer's patented pulse technology will actually desulfate sulfated batteries and condition them to hold a charge. The Solargizer is powered by either a small solar panel or an AC adapter. The Solargizer costs less than $120 from PulseTech Products Corp., 1100 S. Kimball Ave., Southlake, TX 76092; 800-580-7554.

Nice Butt

Prince, the people who brought you the gargantuan tennis racket, entered the golf market last year and one of their first offerings was the Big Butt graphite shaft. Now they've added the Shock Eraser to reduce vibration in the butt upon impact. The Shock Eraser is a 2-piece insert made up of a thermoplastic core inside a thermoplastic elastomer butt cap. The entire insert is pressure fit into the end of the Big Butt shaft, and the thermoplastic's high shock-absorbing qualities reduce vibration by up to 75%, according to Prince. Less vibration minimizes hand, wrist and arm fatigue and reduces the possibility of injury while playing. If you already own graphite Prince clubs, you can have Shock Erasers fit for $5 per club. A Prince Thunderstick Titanium 4000 driver with the Shock Eraser insert lists for $500, but you can probably find it for under $400 at golf shops across the country. Contact Prince, 1 Sportsystem Plaza, Bordentown, NJ 08505; 800-99-PRINCE.

The Future Is Here

Zircon's LaserVision 6.0 combines an angle-reading electronic level with a laser sight. It displays level, plumb and any angle within 360°, and it sounds a tone to alert you when it is positioned at a preset angle. Zircon says you are always assured of accuracy because the tool can be recalibrated in the field with the press of a button. As a transit, it shoots a laser dot up to 150 ft. and is accurate to plus or minus 3/16 in. at 50 ft. It costs $160 to $190 at hardware stores and home centers. An accessory tripod mount costs about $50, while the tripod ranges from $100 to $150. Contact Zircon Corp., 1580 Dell Ave., Campbell, CA 95008; 800-245-9265. PM

Pour it and floor it.

Chem Tooler™ was created exclusively for Berryman Products by Ed "Big Daddy" Roth.™ Ed "Big Daddy" Roth is a trademark of Ed Roth.

OVER 80 YEARS

It takes a pretty stout cleaning formula to chew up carbon deposits and spit out power and acceleration. After one tankful. But that's what we have here. If you don't believe us, ask the guy who just passed you.

Can't find Berryman Products? Diggin' the thought of a Chem Tooler™ t-shirt illustrated by Ed "Big Daddy" Roth™ for only $14.99 plus S & H? Call 1-800-433-1704, ext. 105 and we'll set you up.

© 1997 GM Corp. All rights reserved.

TO A BUG, IT'S A 320-HORSEPOWER BLENDER.

THE NEW 1998 TRANS AM

WITH RAM AIR INDUCTION,

320 HORSEPOWER

AND 6-SPEED TRANSMISSION*

FIREBIRD® TRANS AM THE MUSCLE CAR LIVES

PONTIAC®
DRIVING EXCITEMENT™

www.pontiac.com

*Available options. Call toll-free 1-888-4 FIREBIRD for more information about 1998 products and licensed merchandise.

CAR CARE

CAR CLINIC

BY MIKE ALLEN,
Associate Automotive Editor

What Do You Have In A Pinstripe?

I just bought a nice Mustang, but the kid who owned it last accessorized it to within an inch of its life. I've unbolted most of the really tinny stuff, but the taped-on pinstripes have baked in the sun like a mummy and won't peel off. I've tried solvents, but they don't get under the plastic tape stripe to the adhesive. Do you have any ideas ?

MAUREEN JENKINS
LOS ALAMOS, NM

You don't say what color your Mustang is, but many colors, particularly reds, fade somewhat in the sun. Given where you live and the intensity of the sun there, you might have darker-colored strips of paint hiding under the pinstripes. So be prepared to repaint.

If a solvent like 3M Decal and Woodgrain Remover won't lift your stripes, try shaving the stripe with a single-edge razor blade.

Get a fresh blade. Wrap some masking tap around the ends of the blade to keep the corners from digging in. It wouldn't be a bad idea to flank the tape stripe on the car with some tape as well to protect the finish. Hold the blade tightly between your fingers and at a very shallow angle to the paint. If you're careful—very careful—you can peel up most of the vinyl or polyester plastic of the tape stripe without damaging the paint. Go slowly.

However, this will not remove the adhesive. Lacquer thinner should soften that enough to buff it with a soft cloth. It'll probably be necessary to use rubbing compound to restore the paint's shine by the time you've done all this fooling around. Just be careful not to rub through the clearcoat layer of the paint.

Of course, all of this is predicated on the stripes being tape. If the pinstripes were actually paint applied with a brush, you'd simply have to live with them or have them sanded off and the car repainted.

PM ILLUSTRATION BY DON MANNES

Reservoir Dog

Why doesn't my '95 El Dorado have a coolant overflow reservoir? This seems like a step backward to me. There's a tank connected to the cooling system, but it's called a surge tank, and it has the radiator cap on it. So it's pressurized, and that makes it just an extension of the cooling system, right? At the radiator cap neck there's a 1/4-in. hose that spills down onto the pavement, just like my 1960 Biscayne did a generation ago. Isn't this a step backward, environmentally speaking?

WIN BOWMAN
VIA INTERNET

The purpose of the overflow hose on your Caddy's radiator is to direct boiling liquid away from your face if the hose to the header tank is plugged and the system vents there. The header tank normally catches any overflow from the system.

The purpose of a coolant recovery tank is to catch coolant that bypasses the radiator cap as the engine warms up. If the cooling system is full, as the coolant expands there's no room and the pressure cap will

NOW AVAILABLE!

Popular Mechanics

Editorial Indexes from 1976 to 1997

Are you searching for a particular Popular Mechanics article? Let our yearly indexes make it easier to find. Every article published in the magazine is referenced here—automotive, boating, electronics, home improvement, outdoors, photography, science and more. Thousands of entries are cross-referenced. All years are available from 1976 on. Price for each index is $4.95, plus $1.95 for postage and handling. Order by year.

Popular Mechanics
Reader Information Services Department
224 West 57th Street
New York, NY 10019

Please make check or money order payable to Popular Mechanics. Be sure to include your name and address.

Introducing Drill Doctor®

The Drill Bit Sharpener That Works!

Drill Doctor® 500SP
3/32"-1/2" capacity
$129.00

Stop Throwing Dull, Worn Drill Bits Away

- Easy to use as a pencil sharpener - 60-90 secs./drill bit
- Sharpen High Speed Steel, cobalt and carbide drill bits
- Sharpen 118°, 135° point angles and masonry bits
- Powerful 120 volt motor and six foot cord
- Replaceable DIAMOND wheel
- Splits points to make any drill bits self centering
- 30 day money back guarantee!

To order or receive a brochure:
call toll free: 888 MY DRILL (888•693•7455)

VISA MasterCard

http://www.drilldr.com
or ask for the Drill Doctor®
where you buy tools.

DAREX
Darex Corp. Box 277 Ashland, OR 97520

DRILL DOCTOR
PRECISION DRILL BIT SHARPENER®

CAR CARE

be forced open. As the system cools, coolant will be sucked back into the radiator, keeping it full of coolant and avoiding air bubbles that can collect in odd places inside your engine and cause uneven heating and even overheating. In fact, small amounts of residual air should eventually find their way to the tank (whether it be a header tank or a coolant recovery tank) as the coolant expands, to be replaced by coolant from the tank as the engine cools off. That's why the tank is supposed to have a few ounces of liquid in it even when the engine is dead cold.

A header tank (your surge tank) accomplishes the same thing, providing a reservoir of coolant and a place for air to find a way out. With today's aerodynamic hoodlines, header tanks are used to move a bulky radiator cap away from the radiator. If the header tank's hose comes from the cylinder head instead of from the radiator, it's because that's the high spot on the system, and the best place to bleed air back out. (Some vehicles use a separate bleeder to accomplish this.)

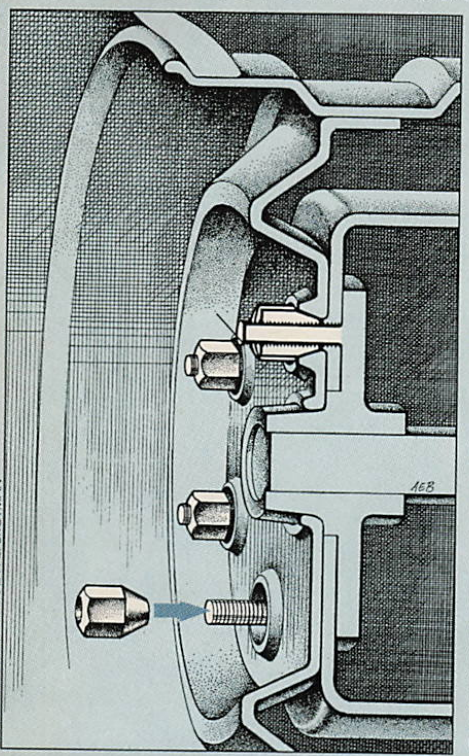
SERVICE TIPS

- Dirty leather in your Ford? You can clean it with only Tanners Preserve Leather Cleaner and a 3M "Type T" scrubbing pad. A Scotch Brite pad is too rough. Technical service bulletin (TSB) No. 97-14-2.
- A new "liftgate ajar" warning switch in your 1996-97 Jeep Grand Cherokee may correct an inoperative rear wiper, a battery-draining current draw, the courtesy lights staying on and other stuff. TSB No. 08-28-97.
- Does the a/c in your 1995-97 full-size 3.8-liter Buick, Olds or Pontiac sedan make an intermittent thumping noise when turned on? You need a new accumulator. TSB No. 73-12-07.
- Saab will actually replace the seat cushions and springs in any 9000 model if you complain that the seating position is too high. TSB No. 05-96-0681.
- If the rear bumper protective cover starts to lift off on a 1995-96 Subaru Legacy Wagon or Impreza, a dealer will refasten it with adhesive for free. TSB No. 15-99-95.
- Although this tip applies to all modern cars, Toyota warns not to get undercoating on the oxygen sensor(s) on any of its vehicles. This will lead to driveability problems. TSB No. EGOO3-96.

Which Way Is Up?

CAR CARE TIP

● It happened again—for the first time in about 20 years. I saw a car come into the shop with the owner complaining about a rumble and a shimmy. He said it started a couple of days after he changed a flat tire for the spare. I noticed that the lug nuts were loose as he was driving across the driveway, so the fix was obvious. He maintained that he personally tightened the lug nuts to the limit of his strength, so they couldn't be loose. What happened? Well, he installed the lug nuts the wrong way, so the chamfered end didn't mate with the chamfered hole in the rim. When you do that, the flat, outer end doesn't center very well on the tapered hole in the rim, and the whole shootin' match works itself loose within days. And because he didn't catch the mistake and fix it immediately, the poor lug had to replace the wheel, five lug nuts and five wheel studs, which were all chewed up beyond salvage.



PM ILLUSTRATION BY ADOLPH E. BROTMAN

Keep On Truckin'

I own a 1988 Camry. The cruise control will no longer disengage when I step on the brake pedal. Is there a simple answer to this?

JOHN BOOTY
VIA INTERNET

One of the brakelight bulbs has burned out.

Subsequent e-mail message from John Booty:

You were right, thank you. Us older-generation folk are not up to date with the newer technologies, although your answer is one I should have logically figured out.

Oil's Well

I changed my oil recently and I put in three quarts of 10W-30 and one quart of 20W-50. Someone told me this would damage my engine.

MOP56
VIA INTERNET

Not really. Well, okay, if you live in International Falls, Minnesota, where it gets really, really cold, you'll be giving up some cranking capability and pre-warmup flow. Most of the time it won't make any difference. In particular, it won't make a difference during warmer weather. More than 1 quart I wouldn't recommend, though. In fact, I don't recommend 20W-50 or 10W-40 oil in general. Multi-viscosity oil has viscosity index improvers added to a lighter-grade base stock to achieve the wide range. VI improvers aren't oil. In fact, they look more like rubber cement. More VI improver means less oil.

Taggin' Along For The Ride

I bought a single-axle 5 × 10-ft. trailer. The manufacturer didn't balance the tires. The dealer says he's never heard of anyone doing that. Is this normal?

GEORGE P. MIXON
VIA INTERNET

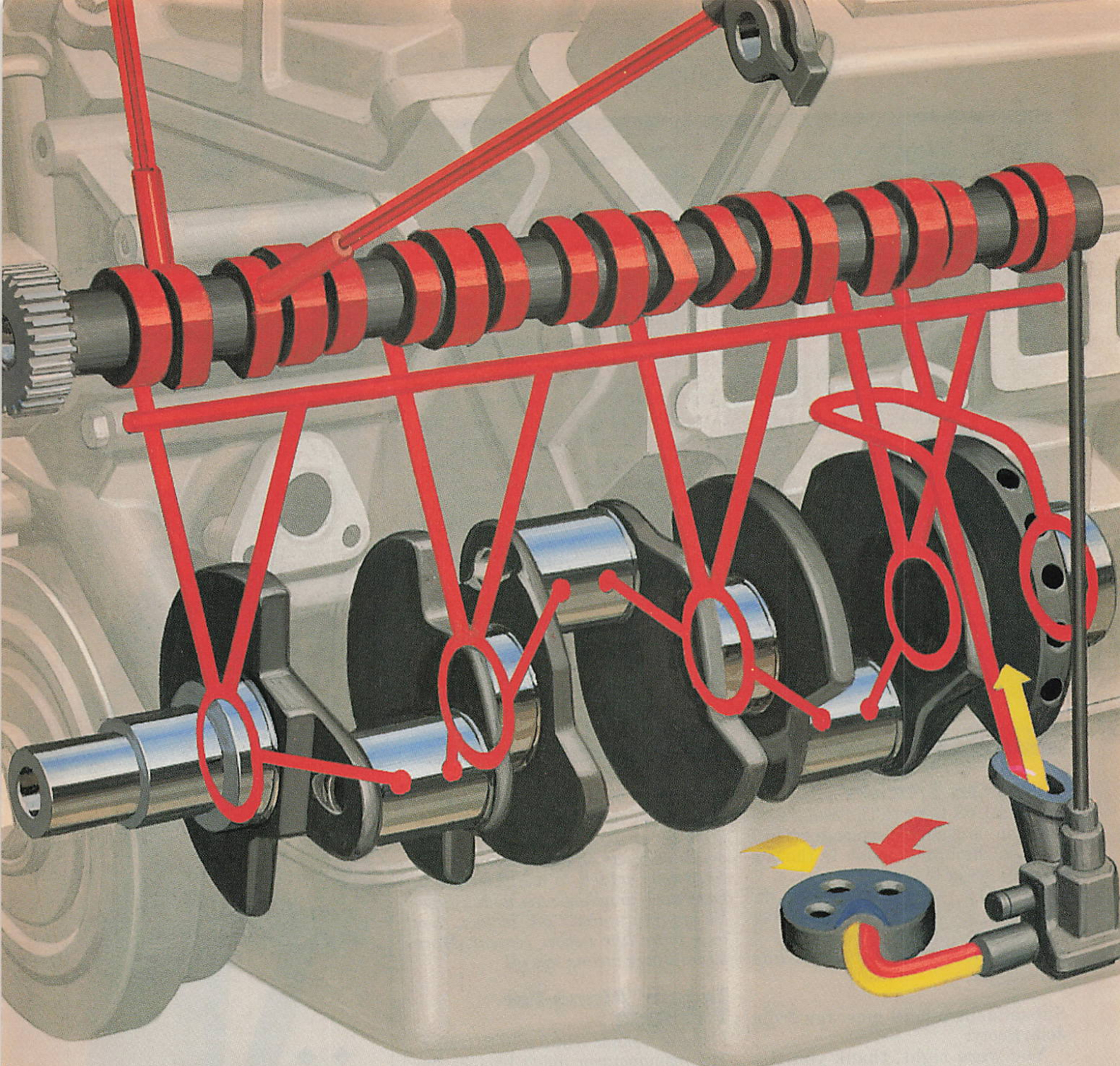
Come to think of it, I've never balanced a trailer tire either. Your trailer uses such a small tire that I don't think it would have much effect. Larger trailers, with larger tires and wheels, might require balancing.

If your trailer shakes, get the wheels balanced, assuming you can find a shop with a balancing machine small enough. PM

DO YOU HAVE A CAR PROBLEM?

Just ask Mike about it. Mail your question to Car Clinic, Popular Mechanics, 224 W. 57th St., New York, NY 10019. While letters, faxes or phone calls cannot be answered individually, problems of general interest will be discussed in the column.

Ultra-Ramps® Plus
For cars, light trucks, vans, and SUVs
Try A New Angle!
◆ No Slip
◆ Maximum Clearance
Available at mass merchandisers, auto parts, hardware, and other retailers wherever quality automotive products are sold.
© 1998, Tru-Cut Automotive. All rights reserved. 1097-28
TRU-CUT AUTOMOTIVE
U.S.A.
www.autoramps.com



Mobil 1 0W-30
Conventional Oil

Oil flow seconds after start-up

0W-30 From Mobil 1. Because Every Time You Start Your Engine It's Low On Oil.

Mobil 1 0W-30 is setting a different kind of speed record: it flows up to seven times faster than conventional oil does at extremely low temperatures. Before conventional oil can even circulate through the engine, our 100% synthetic 0W-30 reaches the camshaft and cylinder walls. And by pumping faster, it helps to reduce metal-to-metal contact during start-ups. For information, call 1-800-ASK-MOBIL, or check the Web at www.Mobil.com. And get your engine off to a good start. **NOTHING OUTPERFORMS MOBIL 1.**

SATURDAY MECHANIC

DEGREE OF DIFFICULTY
EASY

REPLACING YOUR REARVIEW MIRROR

BY KEN JURAN

● The traffic seems unusually light this morning. In fact, you haven't seen another car to the rear for 10 miles. Time to make a little time.

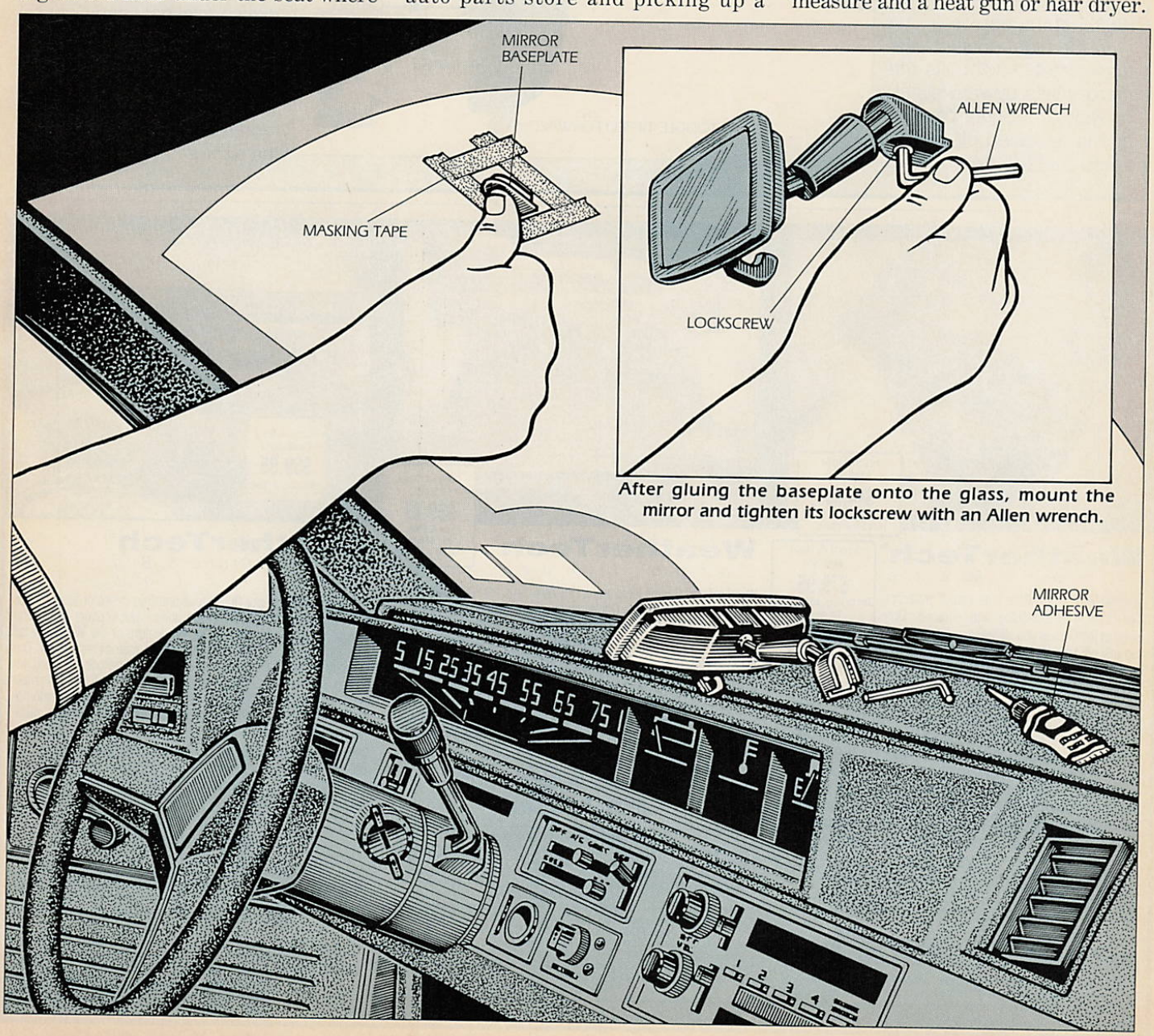
But then there's a strange noise following you. Sounds like a siren. Hmmm. No lights behind you, so where is that sound coming from?

It's coming from the police car that's riding your tail. You didn't see it because your glued-on rearview mirror isn't on the windshield. It's lying on the floor under the seat where your 4-year-old has hidden it after discovering he couldn't do chin-ups on it. Tell that one to the judge.

Reattachment

Luckily, gluing your rearview mirror back on is one of the easiest jobs for a Saturday mechanic. What you need most is patience and a clean working environment. Warm weather helps, too, but it isn't mandatory.

Start by running down to your local auto parts store and picking up a rearview-mirror adhesive kit. It'll come with a vial of superstrong glue and a vial of accelerant to help the glue cure very quickly. There are usually instructions on the back of the cardboard packaging, too, should you need some guidance. You'll also need a razor-blade-type scraper, a small Allen wrench that fits the lockscrew on your mirror's baseplate, a grease pencil or some masking tape and, depending on your particular circumstances, a tape measure and a heat gun or hair dryer.



After gluing the baseplate onto the glass, mount the mirror and tighten its lockscrew with an Allen wrench.

PM ILLUSTRATION BY RUSSELL J. VON SAUERS

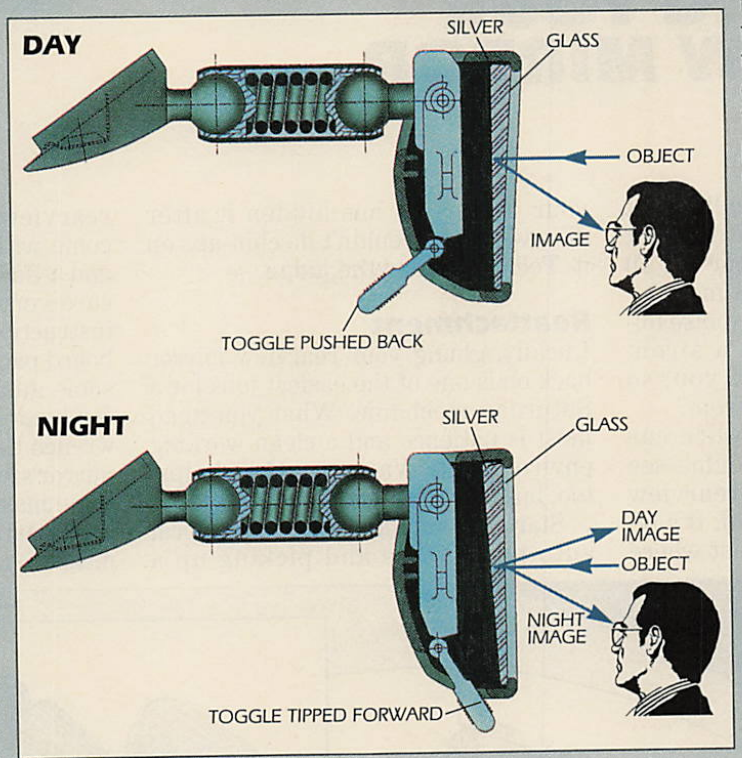
How It Works: The Antiglare Mirror

● Most cars and trucks come with a manually dimmable day/night prismatic rearview mirror. You toggle a little lever from the day position to the night position. And the mirror glass is not flat, but rather beveled. The top edge is thicker than the bottom edge. Here's how the day/night function works.

In the day position, the image you see is reflected off the silvered surface on the back face of the mirror glass. The image is crisp and bright, because the silver provides an almost total reflection (80%) of the object.

In the night position, the toggle mechanism tilts the mirror glass upward slightly. Now, the bright day image is deflected off the silvered surface and up into the vehicle's headliner. And the front (plain glass) surface of the mirror takes over, providing a 5% reflective image. Everything appears very dark, but you can still monitor traffic behind you.

Many carmakers offer an automatically dimming electrochromic rearview mirror that provides an infinite number of brightness levels. These darken automatically according to ambient light conditions and the amount of headlight glare. Sensors feed input to electronics that determine how much voltage to apply to a special gel sandwiched between thin layers of reflective glass in the rear and clear glass up front. The more glare present, the more voltage is applied, and the darker the gel becomes.



DONNELLY CORP. ILLUSTRATION

Front Floor Mat Set
$44.95
Tan or Grey, add $5.00
plus $7 shipping*

Cargo Liners From
$69.95
Tan & Grey, add $10.00
plus $8 shipping*

Stone & Bug Deflectors
$59.95
plus $8 shipping

WeatherTech®
Floor Mats

Front & Rear Mat Set
$79.95
Tan or Grey, add $10.00
Complete
Free Shipping*

WeatherTech® Floor Mats offer carpet protection that is both eye-catching and effective. Only WeatherTech® gives you all season protection you can rely on. Our WeatherTech® Floor Mats are made of up to 13 lbs. of pliable virgin rubber with deeply sculpted channels and an outer rim that traps water, road salt, mud and sand from under your heels. Even in sub-zero weather, the thick natural rubber won't curl, crack, or harden. Because of the deep ridge design, dirt comes off your shoes and stays trapped in the mat, which means you also get added protection for your shoes as well as your carpet. Our WeatherTech® floor mats are designed to hold up to 1-1/2 quarts of water without spilling. A protective, non-stick finish makes cleanup quick and easy. **Now in your choice of Black, Tan or Grey.** ***Available to fit most domestic and imported Cars, Pickup Trucks, Minivans and SUV's.*** WeatherTech® Floor Mats meet FMVSS302 and are TÜV approved.

MacNeil AUTOMOTIVE PRODUCTS LIMITED

Any Combination And We Ship Free!*

Borla · Bilstein · K&N · Performance Friction Carbon Metallic THE POWER TO STOP THE BEST · Eibach SPRINGS

* We pay regular shipping within the 48 contiguous states on the following combinations of items, when shipped to the same address: front & rear set of floor mats, two or more sets of floor mats, a combination of floor mats and cargo liner or the purchase of front and rear set of Wind and Rain Deflectors.

WeatherTech®
Cargo Liners

WeatherTech® Cargo Liners protect the rear cargo area carpeting from all types of wear and tear. Our cargo liners are designed with up to a 3" lip which helps to contain spills from leaky groceries or wet snow boots. They are perfect for hauling gardening supplies, fishing gear, construction materials, bicycles, or the family pet. Cleanup is quick and easy. Just wipe up with a damp cloth, sponge or vacuum. We manufacture the finest liner available for your vehicle! WeatherTech® liners are tough and durable and can withstand even sub-zero or hot summer temperatures. Guaranteed not to crack or break as long as you own your vehicle. WeatherTech® Cargo Liners meet FMVSS302 and are TÜV approved.

Now available in your choice of: Black, Tan or Grey.

SPORT UTILITY LINER APPLICATIONS:
Blazer • Bravada • Bronco • Cherokee • County • CR-V • Discovery • Durango • Expedition • Explorer Grand Cherokee • Jimmy • Land Cruiser • LX450• ML320 • Montero • Montero Sport • Mountaineer Navigator • Navajo • Pathfinder • Passport • QX4 • Range Rover 4.0 SE/4.6 HSE • RAV4 • Rodeo Sidekick • SLX • Sportage • Suburban • Tahoe • Tracker • Trooper • Wrangler • Yukon • 4Runner

VAN / MINIVAN LINER APPLICATIONS:
Aerostar (Ext.) • Astro (Ext.) • Caravan • Club Wagon • MPV • Oasis • Odyssey • Previa • Quest Safari (Ext.) • Sienna • Silhouette • T & C • Trans Sport • Venture • Villager • Voyager • Windstar

AUTOMOBILE TRUNK LINER APPLICATIONS:
A4 • A6 • Accord • Altima • Avalon • BMW 3, 5, 7 Series • Camry • Civic • CL • Concorde • Continental Corvette • Crown Victoria • DeVille • ES300 • Eldorado • Escort • Golf/Golf III • I30 • Integra • Intrepid Jetta/Jetta III • Legacy Wgn./Legacy Outback Wgn. • LS400 • Maxima • Mercedes "C", "E", "S" Class Passat • S70 • Seville • SC/SC1/SC2 • SL/SL1/SL2 • SW1/SW2 • Sable • Taurus • Town Car V70 • V90 • Vision • 740/760/940/960 • 850 • 944

WeatherTech®
Easy-On™ Stone & Bug Deflector

The WeatherTech® Easy On™ Stone and Bug Deflector incorporates some innovative concepts that are unique and superior to existing designs, yet truly functional. The key feature of the WeatherTech® Easy On™ Stone and Bug Deflector is the ease of installation. Our deflector installs in as little as 10 minutes, without the need for drilling. Engineered and approved through wind tunnel testing to meet the demanding specifications of some of the world's largest automobile manufacturers. **Available for most sport utility vehicles, minivans and light trucks.**

When ordering, ask about our WeatherTech® Rear Wind Deflector
The WeatherTech® Rear Wind Deflector. Made from OEM approved 1/4" thick aerospace grade acrylic and "wind tunnel tested" for proven results, this is one deflector that truly works to keep your rear window clean!

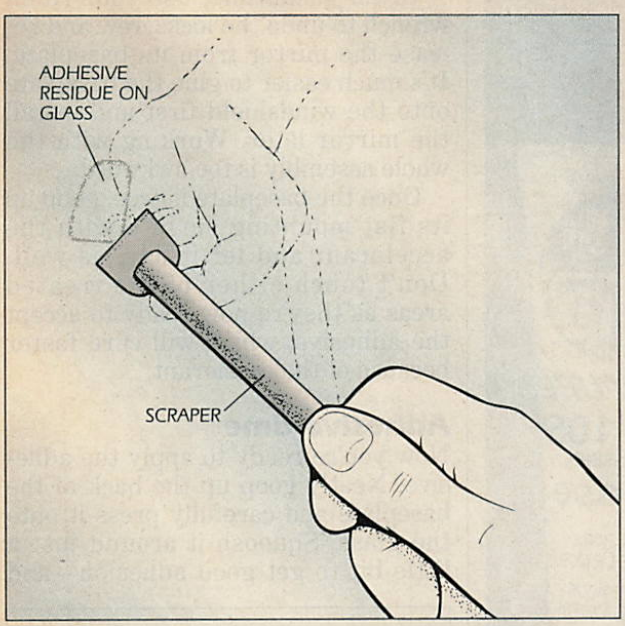
ORDER TODAY:
1 (800) 441-6287
Representatives are available:
Monday through Friday - 7AM-11PM
Saturday - 8AM -11PM & Sunday - 8AM -10PM (Central Time)

Canadian Customers Call:
1 (800) 378-6287

Major credit cards accepted.
We normally ship within 48 hours. Express shipping available.

Visit us on the Internet:
http://www.macneilauto.com

Mac Neil Automotive Products Limited • 2435 Wisconsin Street • Downers Grove, IL 60515 • 630-769-1500 • FAX 630-769-0300



Use a scraper or just a razor blade to remove the old glue. This will be easier if the glass is cold—so do it before warming the windshield.

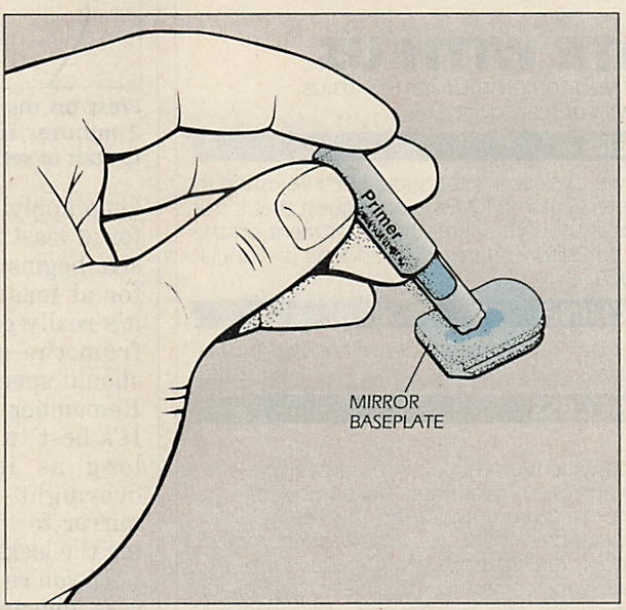
Ready?

Prepare to work outside with the windows open, as the adhesive kit will probably contain acrylic acid, methacrylic ester and trichloroethylene, which you don't want to breathe in large quantities.

Because the adhesive cures faster in warm ambient temperatures, plan on using the heat gun or hair dryer to warm the glass if you're forced to do this job on a cold day. But use common sense. Ice-cold glass will not appreciate being blasted by intense heat. You'll almost definitely crack the windshield this way. To avoid this, hold the heat gun or hair dryer about 12 to 18 in. away from the glass and waft the warm air back and forth to gradually increase the glass temperature. And make sure to scrape off the old glue before warming the glass or you'll create a gooey mess. An alternative is to park the car facing the sun for a few hours before beginning the job.

If the old mirror left behind an obvious amount of residue on the inside of the glass, you won't need the tape measure to locate the midpoint of the windshield. But if you, say, forgot to mark the spot before you cleaned the glass completely, simply measure halfway across the top of the window and about 3 to 4 in. down from the headliner, and that will be your new mounting point.

You can begin the remounting process by marking the outside of the window with a grease pencil over the area where the old glue is. Or you can cordon off the area on the inside with masking tape. (Some sort of mark is useful should you get interrupted after removing the old glue.) The latter is the neater way to work, but leave adequate room around the work area for scraping and cleaning. Now, go at the old glue with your scraper. Once you're down to smooth glass again, wipe the spot down with isopropyl alcohol to get it squeaky clean. Do the same thing on the back of the mirror baseplate so that you have clean metal to work with. Don't touch either surface once it's cleaned or the oil that comes off your fingers will contaminate it.

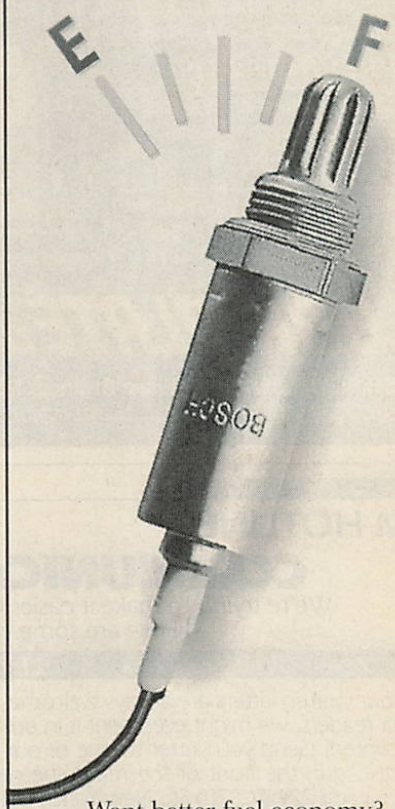


Applying accelerant to the mounting surface speeds the adhesive curing. Don't touch the surface with your fingers.

The acceleration phase

The accelerant (primer) vial will have a double wall of plastic. The inside wall is designed to crack open when you bend the tube. The outside wall simply flexes. This allows the accelerant to drench the felt tip of the vial without leaking out all over your hands. Apply the accelerant liberally to the mounting point on the glass. It

Save wear and tear on your gas gauge.



Want better fuel economy? Just replace your oxygen sensor with a new one from Bosch next time you do a tune-up. It'll help your engine get the optimal air/fuel mixture. That improves your car's performance, reduces air pollution, and saves you money in fuel costs.

So, if your vehicle was built in the '80s or '90s, get a Bosch oxygen sensor and give your gas gauge a break. Call 1-888-O-SENSOR (1-888-673-6767) for a retailer near you.

BOSCH®

©1997 Robert Bosch Corporation, Sales Group.

PM ILLUSTRATIONS BY RON CARBONI

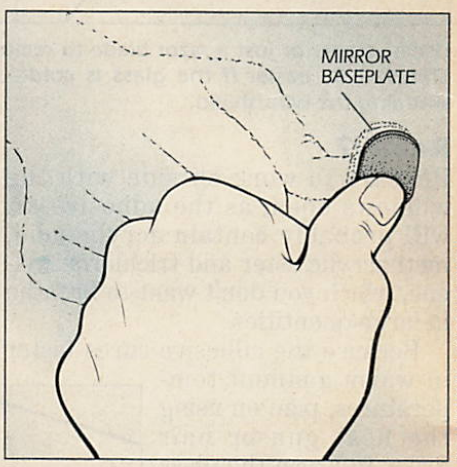
needs 5 minutes to dry.

In the meantime, use your Allen wrench to undo the lockscrew and release the mirror from its baseplate. It's much easier to glue the baseplate onto the windshield first and install the mirror later. Working with the whole assembly is too awkward.

Once the baseplate is free, goop up its flat mounting surface with the accelerant and let it dry, as well. Don't touch either of the treated areas as they're now ready to accept the adhesive, which will cure faster because of the accelerant.

Adhesive time

Now you're ready to apply the adhesive. Neatly goop up the back of the baseplate and carefully press it onto the glass. Squoosh it around just a little bit to get good adhesion—and



PM ILLUSTRATION BY RON CARBONI

Press on the baseplate firmly for at least 2 minutes to allow the fresh adhesive to start to set up on the glass.

keep applying pressure. Don't let go for at least 2 minutes while the adhesive begins to set up. Then let it dry for at least another 15 minutes. If it's really cold out, a little warm air from the heat gun or hair dryer should speed up the curing process. Remember, 15 minutes is a minimum. It's best to let the adhesive cure as long as it is convenient—even overnight—before reattaching the mirror to the baseplate and tightening the lockscrew.

If you're a neatnick, trim the excess glue around the baseplate with a knife or one of the corners of your scraper blade. Then reattach the mirror and readjust it for a safe rearward view.

Oh. And don't pull on the mirror to see how tightly it's mounted. With Murphy's Law always in effect, you just might rip it off the window again. Just leave the mirror be—and keep your kid out of the front seat. The mirror will probably stay up there for the life of the car. **PM**

THERE IS A DIFFERENCE IN MOTOR ASSEMBLY LUBRICANTS

THE LUBRIPLATE® DIFFERENCE!

Professional engine builders specify and use Lubriplate No. 105 Motor Assembly Grease because it works. They know it delivers that extra measure of protection against scuffing, scoring and friction other lubricants can't match.

PROVIDES INSTANT LUBRICATION
before the motor oil circulates during initial start-up preventing damage to critical engine parts.

PREVENTS RUST
and corrosion on newly machined engine parts.

PROTECTS
with a soft smooth anti-wear coating. For gas or diesel engines and transmissions.

Try these other quality Lubriplate products.

LUBRIPLATE® LUBRICANTS

LUBRIPLATE DIVISION / Fiske Brothers Refining Company
CALL 1-800-733-4755 Available at major auto parts stores.

PM HOTLINES

COMMUNICATE WITH US

We're trying to make it easier for you to communicate with us. Here are some ways you can do it.

LETTERS

Your written letters are always welcome. If we think your letter would be interesting to other readers, we might even print it in our Letters column (unless you request that it not be printed). Send your letter to one of our editors, who are listed by department on the masthead in the front of the magazine next to Editor's Notes. Our address is: Popular Mechanics, 224 W. 57th St., New York, NY 10019.

FAX MACHINE

If you have access to a fax machine, you can fax correspondence to us. Our fax number is 212/586-5562, and it's available 24 hours a day.

ONLINE ACCESS

World Wide Web

Computer users with a connection to the World Wide Web can log into our Web site, the PMZone. There are more than 10,000 text, graphics, software and digital movie files to browse through. Every day, you will find a new feature drawn from the Tech Update section. In addition, you'll find exclusive coverage of breaking stories from our Automotive, Science/Technology, Home Improvement, Outdoors or Electronics departments.

To log in, simply launch your browser software (we recommend using Netscape 3.0) and open the following URL: http://popularmechanics.com. We are also part of Hearst's full-service information network, HomeArts. Check it out at http://homearts.com.

Internet E-Mail

If you subscribe to America Online, CompuServe, Prodigy or any other online service offering Internet mail capabilities, you can reach us at popularmechanics@hearst.com. Feel free to leave messages for specific editors, or direct inquiries and comments to a specific department.

READER INFORMATION SERVICES

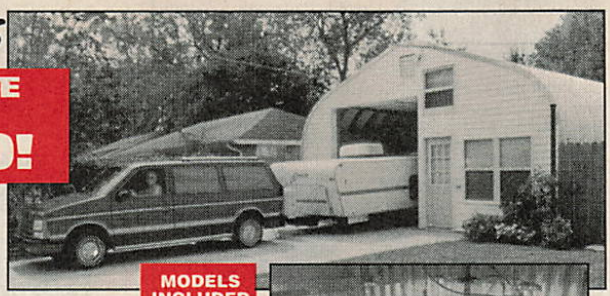
Our Reader Information Services Department is operational five days a week from 9 am to 5 pm Eastern time. The phone number is 212/649-3127. Please call our Reader Information Services Department, *not our editors*, for information about back issues, reprints of articles, etc.

Subscription Inquiries Call 800-333-4948. **To order PM Gear** Call 800-223-3073.

PM Buyer's Guide

For advertising rates call Barbara Jones (212) 649-3136 or Carolyn Bernstein (212) 649-3218. Fax: (212) 258-2253.
Send advertising material to: 224 West 57th Street, New York, NY 10019. 1-800-669-1251.

Steel Buildings
FACTORY REBATE UP TO $5,000.00!



Ideal for:
- Storage of sporting equipment, home improvement supplies, boats and autos
- As a workshop for the do-it-yourselfer
- As a small business location

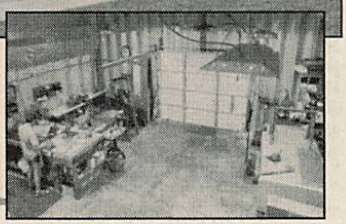
Limited Time Offer

AMERICAN STEEL SPAN

800/891-6733 ask for ext. 436

visit our website - www.steelspan.com

MODELS INCLUDED
20 x 30
25 x 40
30 x 60
45 x 75
51 x 100
55 x 125
other models available



BUILD MUSCLES FAST!

OVER 30 MILLION STUDENTS WORLDWIDE
• No weights • No barbells
• No gym fees • No gadgets
Just big muscles! "Dynamic-Tension"®
Just 15 minutes a day. Guaranteed results.
For info kit on "Atlas" course, send name and address with $2 for postage and handling to:
Charles Atlas, Ltd. P.O. Box 'D', Dept PM1
Madison Square Station, NY, NY USA 10159
www.charlesatlas.com

WIRELESS DRIVEWAY ALARM

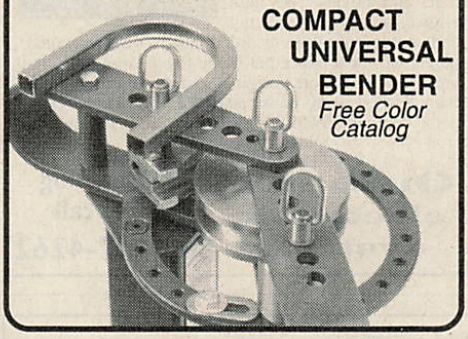
A bell rings in your house anytime someone walks or drives into your place.
- Free Literature -
DAKOTA ALERT, INC.
BOX 130, ELK POINT, SD 57025
605-356-2772

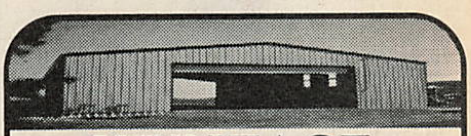
ULTIMATE HOME SHOP
Complete tools for metal & woodworking

Starting at **$995**
Smithy
Easy to use
Versatile
Affordable
FREE CATALOG

Call 1-800-345-6342 or write: Smithy Dept. PMC, PO Box 1517, Ann Arbor, MI 48106-1517

SHOP OUTFITTERS
307-745-5999 • Fax 307-742-5999
COMPACT UNIVERSAL BENDER
Free Color Catalog





HERITAGE
BUILDING SYSTEMS
800-643-5555

BUILD IT YOURSELF AND SAVE

30 x 50 x 10	$5,220
30 x 90 x 10	$8,161
40 x 60 x 12	$7,523
50 x 90 x 10	$11,699
60 x 75 x 10	$11,581
100 x 200 x 14M-1	$44,663

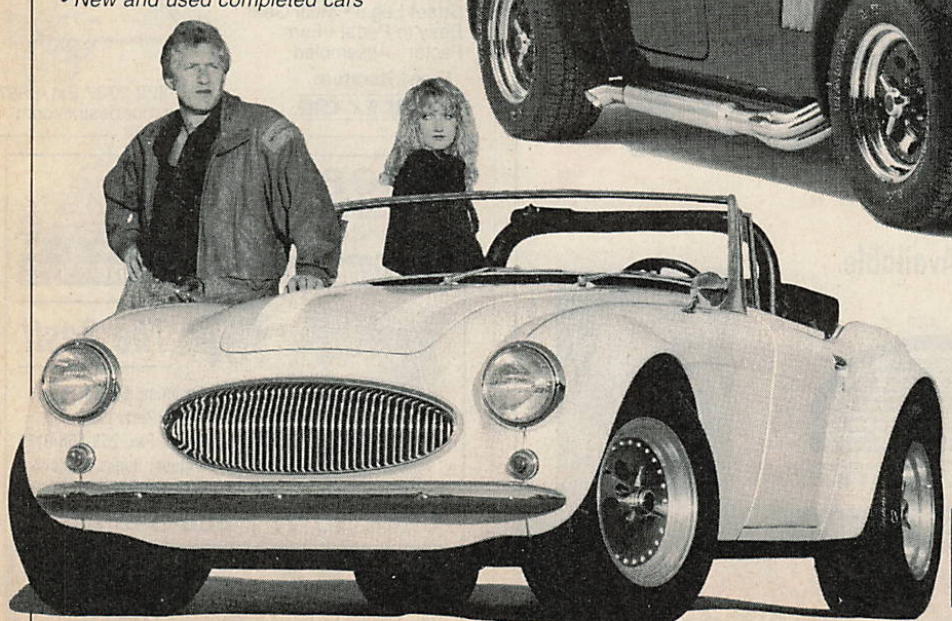
Commercial steel buildings featuring easy bolt up assembly from America's largest distributor. We have over 10,000 standard sizes of shop, farm, industrial, commercial and mini-warehouse buildings. All are complete with engineer stamped permit drawings, 20 year roof and wall rust warranty. Call us today for a free information package and a quote on our top quality buildings or building component parts.

Mini Warehouse Sale
$16,125
30' x 150' with 38 units complete with partitions
www.metalbldg.com

OUR TOP GUNS!
Classic Styling, Modern V8 Power, *Fantastic Family Project!*

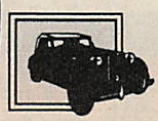
Assemble and drive the most coveted sports cars ever to hit the streets. From the world's leading manufacturer of specialty cars, Classic Roadsters.
- *V8 Power: engineered for Ford or Chevy small and big blocks*
- *Heavy gauge box steel frame*
- *Highest quality fiberglass body*
- *Most complete component Kit*
- *Money-back quality guarantee*
- *New and used completed cars*

THE CLASSIC 427
1966 Cobra* reproduction



THE SEBRING
Austin-Healey reproduction

Special Incentive Offer!
Call Now for Limited Time Pricing and Free Information
1-800-373-9000
Ext. 103
EXPORT CUSTOMERS CALL 701-293-8866



Classic Roadsters
1617 Main Avenue
Fargo, ND 58103

* Cobra is a trademark of Ford Motor Company. Classic Roadsters' products have no connection with Ford.

DRILL-OUT® Power Extractors

The world's most advanced technology for extracting broken screws fast and easy. Available in most hardware stores and industrial suppliers

Made in USA.
Alden Corporation
Munson Rd., Po Box 6262, Wolcott, CT 06716
Toll Free: 800-832-5336
Tel: 203-879-4889
Fax: 203-879-6097
Email: alden@aldn.com
www.aldencorporation.com

Cable Converters & Descramblers

Cable TV Equipment— save money by owning your equipment and you can still receive all basic and premium channels through your local cable company. We offer many names including Scientific Atlanta, Jerrold, Panasonic, Tocom, Pioneer, and Zenith. Just call one of our representatives who will assist you in finding the right unit that is compatible with your local cable company. * As a consumer receiving cable access, it is your legal and moral responsibility to pay your local cable company for cable service you receive. All cable TV equipment must be used according to The Federal Cable Televsion Consumer Protection and Competition Act of 1996.

Phantom Radar/Laser Jammer

A combined radar detector and radar/laser scrambler. It uses an FM-chirp to confuse the radar/laser gun. Comes with 12-volt accessory jack with plugs, windshield bracket, and 3 year manufacturer's warranty. Also comes with 1 year ticket rebate (restrictions may apply). Not available in MN, DC, or OK. **$309.99**

Phazer Radar Jammer

Same as above but without radar detector. Not available in MN, DC, or OK. **$199.99**

Video Clarifier *copies any video*

State-of-the-art circuitry restores original clarity of rented or purchased video tapes and movies. This item allows for flawless viewing and copying of all prerecorded videos whether rented, purchased, or produced at home (even copy-protected tapes*). Also restores original quality to older videos. Includes 12-volt AC power adapter and switchable channel 3/4 output. **$59.99** *All units for home use only. Not made or sold for unauthorized recording of copyrighted works.

OutbacK electronic systems

FREE catalog please call 800-547-4262

CABLE T.V. DESCRAMBLERS

ALL MAJOR BRANDS — ORIGINAL EQUIPMENT

1 Year Warranty
30-day M.B.G. • Dealers Welcome
http://wahoo.netrunner.net/~chipsmrt
800-208-2638
MC/VISA/AMEX • No FL Sales
TEST CHIPS
CHIPSMART

KEEP YOUR C-BAND SYSTEM RUNNING STRONG!
Free Buyer's Guide
BEST VALUES ON...
- Receivers, including 4DTV
- Skypac® Programming
- Dish Movers & LNBs, all kinds
- Toll Free Technical Help
- Tune-up Kits, Tools & Parts

Int'l: 218-739-5231 Fax: 218-739-4879
Call Now 800-543-3025
www.skyvision.com
Skyvision

CAD DIGGER

Build It Yourself Backhoe • Send For Free Brochure

Plans for several models:
- 5 to 9 ft digging depth
- free standing or 3pt hitch
Starting at $1000 to build
No machining Car Towable

CADplans
Visit our website: www.CADplans.com
Kits Available!
P.O. Box 606, Dept. P • Daleville, VA 24083 • 1-800-817-5267

VCR REPAIR PROFITS!
LEARN IN 30 DAYS OR LESS!

All new "*mech-a-tronics method*" of VCR repair. Learn to instantly troubleshoot and repair *any* VCR! Earn over $1,100 weekly! *11 million VCRs sold in '96. Who will fix them?* SECRETS REVEALED! FREE INFO. Call or Write.

213-654-9613 PH Development, Inc.
8556 Hillside Ave. Dept. 11, Los Angeles, CA 90069

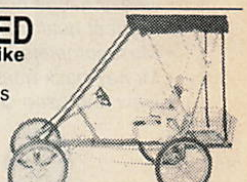
Franchise your business!

Call for information on franchising and "Franchise Your Business!" seminars scheduled throughout the country.

Francorp
Specialists in Franchise Development
1-800-FRANCHISE (1-800-372-6244) POPM

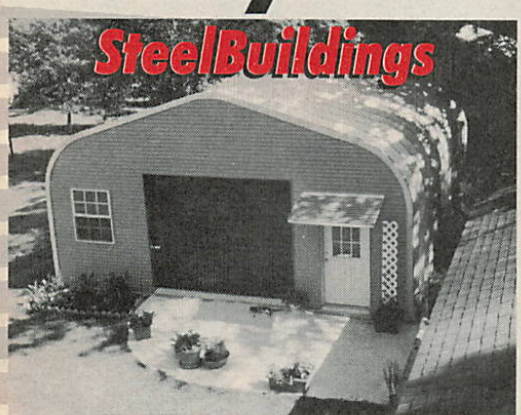
PEDAL POWERED VEHICLE- Drives Like a Car!

1, 2 & 4 Passenger Models
Street Legal • Multi Gear
Easy to Pedal • Fun
Factory Assembled



Free Literature
RHOADES CAR
1-615-822-2737 Ext. 8687
www.rhoadesinfo.com

Backyard Shops



Spring Inventory Sale

Save up to 60%

SAVE ON SELECT SIZES
25X34 • 30X46
40X56 • 50X116

- America's #1 Arch-Type Manufacturer
- 20 Year Warranty • Easy Financing Available
- Easy Do-It-Yourself Construction
- Free 16 Page Brochure

STEELMASTER®

© 1998 Steelmaster Buildings Inc.

Save Thousands
Call Today **1 800 888-4606**

SHOP-TASK
MILL • LATHE • DRILL
P.O. Box 64268, Tacoma, WA 98464

The Original — 15th Anniversary

FREE CATALOG

The Best!

- Technical Support Line
- Spare Parts Line
- 24 Hr. Fax: 253-566-0175
- Videos, Books, Projects

HTTP://WWW.SHOPTASK.COM
CALL NOW: 1-800-343-5775

YOU CAN DO IT!
MACHINING MADE EASY

BE A HERO ON MOTHER'S DAY

ACTUAL SIZE 1-1/8"

Does she deserve a medal for all she does?
Solid Silver Mother and Child Medallion
$59.00. Engrave names $5.00 each.
Also available in 14K gold.
Order by May 2nd for FREE CHAIN and Guaranteed Mother's Day Delivery.
Lynn's Jewelry
1-800-295-5859 TUES.-SAT. SATISFACTION GUARANTEED PM 498

SURVEILLANCE HIDDEN CAMERAS

DIRECT FROM MANUFACTURER - BEST PRICE IN THE MARKET

Ultra minature hidden camera in wallclock, desktop lamp, smoke or motion dector. BW /Color. Wide view angle. Low light sensitivity, super sharp images,+ video and audio. From $159.00 . Also 1/3" B/W board Cameras w/mic. Only $99 .00. Wireless hidden camera, starts at $249.00 +$5.95 S/H. Wholesale/Retail. COD,Check/MO (U.S. $ Only)+ VISA/MC

BOLIDE INTERNATIONAL CORPORATION
(800) 355-0895 or (626) 575-8178
9660 Flair Drive, #218, Dept. PM, El Monte, CA 91731
http://www.bolideamazingproducts.com/

"HOW TO BUILD" YOUR OWN

MINI BIKE	$ 5.00
GO CART	$ 5.00
DOWNHILL RACER	$ 4.00
1 MAN HOVERCRAFT	$ 6.00

Send today for plans.

FREE GIFT with every order!

ALLOW 7 TO 10 DAYS FOR DELIVERY.
Power Products Plans, Dept.198
1223 Borg Temperance, MI 48182

OUTDOOR BAR-B-CUES

START YOUR OWN BUSINESS.
MADE OF SAND & CEMENT.
HIGH PROFITS. COMPLETE
FORMS & PROCESS AVAIL.

RPT MFG. INC.
Box 2792, Ivyland, PA 18974

KITES

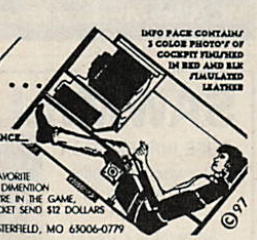
FREE COLOR CATALOG
Choose from over 200 exciting kites.
• Many unusual & innovative designs.
Call or write for your catalog today!
Into The Wind • (800) 541-0314
1408-M Pearl St., Boulder, CO 80302

THE ONLY WAY TO **FLY... INDOORS!**

THE ULTIMATE ENTERTAINMENT EXPERIENCE...

THIS FULLY ENCLOSED, FUNCTIONAL COCKPIT ROTATES OVER 75 DEGREES IN ANY DIRECTION. SIMULATES FLYING, AUTO RACING, OR YOUR FAVORITE ROLLER COASTER RIDES. ADDS A WHOLE NEW DIMENTION TO ACTION VIDIOS. FEELS SO REAL, NOW YOU'RE IN THE GAME, NOT JUST PLAYING IT ! FOR PROJECT INFO PACKET SEND $12 DOLLARS

INFO PACK CONTAINS 3 COLOR PHOTO'S OF COCKPIT FINISHED IN RED AND BLK SIMULATED LEATHER



©'97

TO: SERIOUS SIMULATION, PO BOX 779, CHESTERFIELD, MO 63006-0779

Sunshine Electronics

CABLE TV DESCRAMBLERS

Best Prices • Friendly Service
Dealer's Special

Two Piece Set $99

Minimum Quantity: 10 Lot

30 Day Free Trial • 1 Yr. Wrnty.
All Makes and Models Available

1-800-370-1764

Open M-F 9-9 Sat 10-5 CST

CABLE TV CONVERTERS &

DESCRAMBLERS

TKA ELECTRONICS
13217 "C" St. Omaha, NE 68144

Friendly Service.
30 Day trial period.
13 Month Warranty.

www.tkaelectronics.com

FOR A FREE CATALOG OR INFO. CALL:

1-800-729-1776

UNITED STRUCTURES

STEEL BUILDINGS

SHOPS/GARAGES/WAREHOUSES
• Easy do-it-yourself construction
• Immediate delivery or free storage

LIMITED OFFER!
for example:
21×30 from $2490
Other sizes available

FREE BROCHURE **1-800-332-6430**

MEMBER OF THE BETTER BUSINESS BUREAU

SECRETS!

Discover one of the most bizarre collections of incredible plans, lost secrets, forgotten how-to, and strange books ever assembled! Write for a catalog!

Learn how to make neon signs, rewind motors.

- **Plastics!** Get high power from auto alternators and generators.
- **Hydrogen!** Run your car on coal and electricity. Build
- **Homesteading!** a working solar cell, shortwave
- **Booze!** radio, robot, Tesla Coil, Jacob's Ladder, Van de
- **Radio!** Graaff, & more!
- **Tesla!** Secrets of making booze,
- **Chemistry!**
- **Much More!**

embalming corpses, homesteading, survival. Plastic injection molding! Recycle precious metals! Make magnets! Learn calculus, physics. Much more! Finest collection of Tesla books! Cameras, sawmills, crystal sets, electronics. **Secrets few people know!**

Write for Lindsay's Secrets catalog! All books highest quality! Guaranteed. Catalog sent immediately! Write today! FAX 815/935-5477

Catalog of Bizarre Books

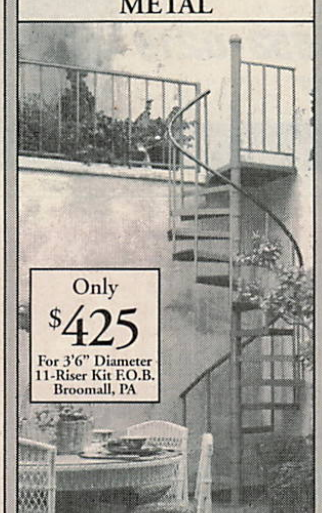
Send Your Name and Address to

lindsay's **SECRETS!**

Box 538-WN16, Bradley IL 60915

http://www.keynet.net/~lindsay

Quality and Value Since 1931

METAL	OAK	VICTORIAN
		
Only $425 For 3'6" Diameter 11-Riser Kit F.O.B. Broomall, PA	Only $1575 For 4'0" Diameter 11-Riser Kit F.O.B. Broomall, PA	Only $3300 For 4'0" Diameter 11-Riser Kit F.O.B. Broomall, PA
		Shown 5' diam. with optional brass handrail, in-between spindles, and scroll tread ends.
•Diameters 3'6" to 7'0" •Kits or Welded Units	•Diameters 4'0" to 6'0" •All Oak Construction	•Diameters 4'0" to 6'0" •Weight Saving Cast Aluminum

All kits available in any floor-to-floor height and BOCA/UBC code models. Made in the U.S.A.

Call for the FREE 32 page color catalog:

1-800-523-7427 Ext. PM98

or visit our Web Site at http://www.theironshop.com

Showroom/Warehouse Locations:

Broomall, PA	(610) 544-7100	Houston, TX	(713) 789-0648
Ontario, CA	(909) 605-1000	Chicago, IL	(847) 952-9010
Sarasota, FL	(941) 923-1479	Stamford, CT	(203) 325-8466

Please send me the FREE 32 page color catalog:

Name_____

Address_____

City_____ State____ Zip_____

Mail to: The Iron Shop, Dept. PM98, Box 547, 400 Reed Rd., Broomall, PA 19008.

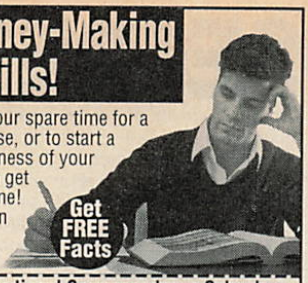
The Leading Manufacturer of Spiral Stair Kits™

THE IRON SHOP®

©1997 THE IRON SHOP

Learn Money-Making Career Skills!

Train at home in your spare time for a promotion, pay raise, or to start a new career or business of your own. You can even get your Degree at home! Call or send coupon to ICS® for FREE Information!



International Correspondence Schools
Dept. APBS38S, 925 Oak Street, Scranton, PA 18515

Send free facts and color brochure on how I can study at home for the career I have chosen. No obligation. **Check One Box Only!**

ASSOCIATE IN SPECIALIZED BUSINESS DEGREE PROGRAMS
- ☐ 60 Business Management
- ☐ 61 Accounting
- ☐ 80 Bus. Mgmt.—Marketing Option
- ☐ 81 Bus. Mgmt.—Finance Option
- ☐ 64 Applied Computer Science

ASSOCIATE IN SPECIALIZED TECHNOLOGY DEGREE PROGRAMS
- ☐ 63 Civil Engineering Technology
- ☐ 62 Mechanical Engineering Tech.
- ☐ 65 Electrical Engineering Tech.
- ☐ 66 Industrial Engineering Tech.
- ☐ 67 Electronics Technology

CAREER DIPLOMA PROGRAMS
- ☐ 07 High School
- ☐ 18 Bookkeeping
- ☐ 96 Tax Preparer
- ☐ 13 Secretary
- ☐ 38 Personal Computer Specialist
- ☐ 27 PC Repair
- ☐ 22 Wildlife/Forestry Conservation
- ☐ 23 Medical Office Assistant
- ☐ 24 Dental Assistant
- ☐ 19 Bartender
- ☐ 57 Home Health Aide*
- ☐ 55 Diesel Mechanics
- ☐ 06 Electrician
- ☐ 79 Electronics Technician
- ☐ 70 Small Business Management
- ☐ 25 Gun Repair
- ☐ 08 Legal Assistant
- ☐ 33 Motorcycle Repair
- ☐ 04 Auto Mechanics
- ☐ 14 Air Conditioning & Refrig.
- ☐ 87 TV/VCR Repair
- ☐ 58 Private Investigator
- ☐ 56 Pet Groomer
- ☐ 76 Freelance Writer
- ☐ 39 Medical Transcriptionist
- ☐ 84 Pharmacy Technician
- ☐ 15 Home Inspector
- ☐ 31 Locksmith
- ☐ 72 Appliance Repair
- ☐ 83 Internet Web Page Designer
- ☐ 85 Drafting
- ☐ 54 AutoCAD
- ☐ 89 Small Engine Repair
- ☐ 151 Plumber
- ☐ 152 Mason
- ☐ 158 Auto Body Repair Technician
- ☐ 148 Drywall Installer & Finisher
- ☐ 104 Carpenter
- ☐ 145 Home Remodeling & Repair
- ☐ 103 Auto Detailer

COMPUTER PROGRAMMING
- ☐ 01 Programming in BASIC
- ☐ 37 Visual Basic
- ☐ 82 Java
- ☐ 69 COBOL*

*For personal enrichment

151YC

Name_____ Age_____
Street_____ Apt. #_____
City/State_____ Zip_____
Phone ( )_____

Call toll free! **1-800-595-5505 ext. 1976**
Call anytime—24 hours a day, 7 days a week.
OR MAIL COUPON TODAY!
http://www.icslearn.com

HOME GUARD
WATER POWERED BACKUP PUMP SYSTEM
TAKES OVER WITHOUT . . . Motor, Electricity or Batteries

- ✓ Uses Household Water Pressure
- ✓ Thousands In Use
- ✓ No Maintenance!

FAST, EASY INSTALLATION

VISIT OUR WEB SITE: http://www.hiloind.com

FOR MORE INFO OR TO PLACE AN ORDER CALL 1-800-928-7867

Hilo Industries

DESCRAMBLER KIT
$14.95
WHY PAY HUNDREDS MORE?
1-800-752-1389
(24 HOURS) Diametrical Dist.

Save Money
sawing your own lumber.

Make Money
sawing for others.

Saw trees up to 36" D. or 45' L.
(w/optional bed extension(s)

Free $2 Catalog

1-800-553-0219

Wood-Mizer® 8180 West 10th Street Dept. 109 Indianapolis, IN 46214-2400 www.woodmizer.com

*With the purchase of All Products Video @ $10.00

Personal sawmills from: **$4495**

WHOLESALE PRICES STARTING AS LOW AS $99.00
CABLE TV DESCRAMBLERS
CONVERTERS
FILTERS · VIDEO STABILIZERS

1 Year Warranty on All Products.
Affordable Extended Warranty.
FREE CATALOG!

Call the Cable Professionals 24 Hours A Day!

C.O.D. VISA MasterCard DISCOVER

Orion Electronics
1-800-379-3976
HTTP://WWW.ORION-ELECTRONICS.COM

AMERICA'S LARGEST SUNROOM COMPANY
SUNROOMS AND CONSERVATORIES

PRE-SEASON SPRING SALE!
Factory Savings Up To 35%* And More. Limited Time Offer!

Take a vacation at home this year and every year. Enjoy the sun and fresh air year 'round without rain, wind and insects. Great for dining area, home office, spa or exercise room, etc.. Full installation or do-it-yourself kits. Exclusive MC solar control glass. Free screens for summer on all windows.

FOUR SEASONS SUNROOMS

SUNROOMS · CONSERVATORIES · PATIO ROOMS
RESIDENTIAL AND COMMERCIAL ENCLOSURES

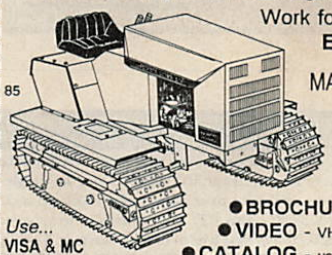
Call Us For Our Free Catalog And Showroom Locations
1-800-FOUR-SEASONS
1-800-368-7732 or write:
Four Seasons Sunrooms Corp., Dept. PMX804
5005 Veterans Memorial Hwy., Holbrook, NY 11741

©1997 Four Seasons Solar Products Corp.
Dealer/Franchise Territories Available Please Call: 1-800 521-0179

FREE info
SAVE MONEY WITH A MAGNATRAC®

Buy Factory-Direct. Do your own work. Grade roads, landscape, mow hillsides, clear land, excavate, garden, haul logs, dig ponds.

Work for others for **Extra Cash!**



MAGNATRAC Crawlers low as **$4500!**

Use... VISA & MC (414) 377-7211

- ● BROCHURE - *FREE*
- ● VIDEO - VHS (45 min) $9
- ● CATALOG - uses & prices $2

STRUCK CORP · BOX 307 · DEPT:PM0498
CEDARBURG, WI 53012-0307

World's Tiniest **HOMEBUILT HELICOPTER**

Easy, low-cost construction!
- Vertical take-off
- Carries one person
- No license needed!
- An experimental ultralight helicopter

Complete G-1 Plans: **Only $24.95**
(Add $3 post. Foreign add $6)
2 FREE BONUSES: A HELICOPTER EXPERIMENTER BOOK & A HOMEBUILT HELI. CATALOG
Catalog only: $10

VORTECH, inc.
PO Box 511-P • Fallston, MD 21047
VISA 24-HR. ORDERLINE:
410-692-0333 (OR: 410-337-0212)

TAN at HOME!
For as Low as **$20/Month**
BUY DIRECT & SAVE
HOME DELIVERY
Commercial Units Available

1·800·842·1324

Introducing
SUPER MET-AL™ MARKER

MULTI-USE
MADE IN U.S.A.

Comes In All Primary Colors, Neon Colors, Metallic Gold & Metallic Silver
Call 1-800-851-8464 For Free Sample & Information
SK Merchandising Corp. · Olyphant, PA
FAX: (717) 383-9482

FULL SIZE SPINNING WHEEL

PLANS & INST'S. $19.95
RR Plans PO Box 1554
Taylors, SC 29687
FAX 864/292-5029
MC/Visa/AmExp/Disc.

SAWMILL $3795.
FREE INFORMATION
Norwood Sawmills
90 Curtwright Dr.
Unit 3
Amherst N.Y. 14221
1-800-661-7746

Make and Sell Your Own Ornamental Concrete Items!

Book about Aluminum Molds including over 425 designs, prices and production trade secrets from the world's largest mold manufacturer.

Book only $10

CONCRETE MACHINERY CO., INC.
P.O. Box A99, Hickory, NC 28603

THE UNIT OF THE FUTURE

Cable TV Combination Converter & Accessory

STOP Jamming Me

VIDEO CLARIFIER Guaranteed to eliminate all copy protection

1-800-441-6075

FREE CATALOG GLOBAL ELECTRONICS

Jet Power

up to 37 lbs. of thrust!!

BUILD THIS AMAZING JET ENGINE IN YOUR OWN HOME SHOP!

Yes! We sell kits!

Jet power for • HOMEBUILT HELICOPTERS • AIRPLANES • JET PACKS • GO-KARTS • BIKES • ROCKETRY

Complete Pulsejet Plans ONLY $24.95 plus $3 p/h — $6 foreign

INCLUDED: 2 FREE BONUSES:
1. Two extra Jet Engine building plans (pulsejet & ramjet).
2. How to Build a Jet Helicopter (two kinds!).
BOTH FULLY ILLUSTRATED! A $15.00 Value!

24-hour credit-card line: (410)836-6824 OR: (410)692-0810

Order from: Windspire • PO Box 145-P Long Green, MD 21092

GO KARTS

BUILD YOUR OWN KART
COMPLETE HOW TO BUILD VIDIO
$19.95 + S & H
FRAMES $99.95 KITS $489.95
913-780-2885

The Monolithic Dome

A super-strong, insulated, steel-reinforced concrete building that is energy efficient and disaster resistant. Used for homes, schools, churches, offices, stadiums, storages, cabins, and more. Built throughout the U.S. and in many other countries, for 20 years, the Monolithic Dome is tomorrow's building available today.

Call for FREE brochure or send $19.95 ($5 s/h) for 60 minute info video.

(800) 608-0001
PO Box 479-PM
Italy, TX 76651
www.monolithicdome.com

CABLE TV CHANNELS EQUIPMENT 1 Year Warranty

FREE TV Cable Catalog

30 Day Free Trial
Open Every Day

SAVE 1000's VISA • MC C.O.D.

MEGA ELECTRONICS
1-800-676-6342

Celebrate July 4th & All Events

CARBIDE CANNON

BIG BANG! $119.95

Mammoth Cannons shoot with terrific BANG! Have a bang-up time at special events. Uses powdered carbide ammo. Hundreds of shots for few cents. All metal construction with large, rugged cast iron wheels. Machined brass mechanism for easy loading and firing. Authentic turn-of-century design. Handsome decor when not in use. Made in USA to last a lifetime. Available in 3 sizes: 9" cannon, **$49.95 postpaid;** 17" cannon, **$89.95 postpaid;** 25" cannon (shown here) with rapid firing and automatic loading, **$119.95 postpaid.** The larger the cannon the louder the bang! **Carbide ammo, about 100 shots, $6.00; 3-pack $15.00. Spark plugs, 3-pack $2.00.** Send check, money order or call. Visa, MasterCard accepted by mail or phone. Give card number & expiration. Money-back guarantee. Send for **FREE CATALOG!**

The Conestoga Co., Inc., Dept PM, PO Box 405, Bethlehem, PA 18016

★★ Call 1-800-987-BANG ★★

www.bigbangcannons.com

10 tools 1 machine

Own the ultimate home shop

SUPER SHOP

SuperShop® or Shopsmith®—You can SEE the difference

Call today for your FREE SuperShop info pak and special limited-time offer. Now is a great time to get a deal on a SuperShop!

SuperShop Model 720® $2595*

Shopsmith Mark V® $2795*

*Current prices at time of publication.

Call now— (800) 277-1125
Ask for operator PMW

"My SuperShop isn't the Cadillac®, it's the Mercedes® of combination woodworking tools. My old 5-in-1 is going to be very lonely over in the corner." —Edward Zych (TN)

or write: SuperShop • Dept. PMW, PO Box 1517 Ann Arbor, MI 48106-1517

CABLE WAREHOUSE

Buy Directly from the Wholesalers
No Middleman
Latest State-of-the-Art Products at the Lowest Price!

BRAND NEW 2-PIECE SYSTEMS

10	20	50	100
$94	$92	$91	$89

Compatible Cable TV Equipment to Replace Most Major Brands

Lowest Prices DEALERS WANTED Best Products

VISA MC DIS AMEX COD

800-416-0016

B L E Wholesale

No Florida Sales

PENTIUM PC PROFITS!
EARN $2,000 WEEKLY!

Learn to Assemble Custom-Built Pentium PCs. RESELL @ $200 PROFIT! Learn to Troubleshoot, Repair and Maintain Pentium PCs. BOOMING MARKET! SECRETS REVEALED! FREE INFO. Call or write:

213-654-9613 PH Development, Inc.
8556 Hillside Ave. Dept.12, Los Angeles, CA 90069

The Mini-500 BRAVO

Financing & Insurance Now Available!

THE WORLD'S HOTTEST SELLING HELICOPTER!

Performance Above and Beyond Your Expectations!

An Affordable, Personal Helicopter • The Choice for a Variety of Private, Utility and Recreational Applications • Low Maintenance and Operating Cost of About $10/Hr. • Patented Control System with the Latest in Advanced Helicopter and Manufacturing Technologies

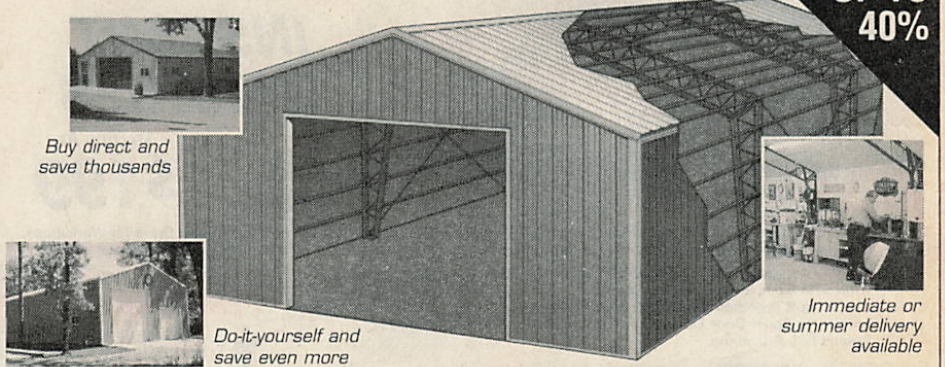
Info Pack & Video Combo: VHS....$30 PAL $45

We accept: MC, Visa, AMEX, Discover

REVOLUTION Helicopter Corp.
1905 W. Jesse James Rd. PM • Excelsior Springs, MO 64024
Tel. (816) 637-2800 • Fax (816) 637-7936 • Orders: (800) 637-6867
E-Mail: sales@revolutionhelicopter.com
Web Site: http://www.revolutionhelicopter.com

CALL NOW AND SAVE UP TO 40%

Do-it-yourself building systems from MiracleTruss® can save you thousands



Buy direct and save thousands

Do-it-yourself and save even more

Immediate or summer delivery available

MIRACLETRUSS®

Pre-engineered for simple assembly and durability

We do more in the shop, so you'll do less on the job-site. Our practical design, clear, complete instructions and knowledgeable customer service let you construct your building yourself. No building experience or heavy equipment is necessary.

The difference is in our materials

All materials are a unique combination of steel and wood for strength. The ICBO inspects and certifies our welders and materials to insure excellence... something you just won't find with other building systems!

Quality that stands up to the toughest weather

Specially designed, heavy duty roll-formed steel roof and side panels have a weather-tight lap that seals out damaging ice and water for ultimate protection.

Setting the industry standard for multipurpose buildings

CALL NOW FOR YOUR FREE BROCHURE!

Ask how you can get a professional quote, call today!

1-800-843-8275

❑ *Yes!* I'm ready to save thousands with a factory-direct MiracleTruss® building system. Please send me my full color brochure and request for quotation. I understand I am under no obligation.

Name

Address

City State Zip

Daytime Phone ( )

Mail to: MiracleTruss® Waterford Tower-Suite 500 505 N. Highway 169 Minneapolis, MN 55441-6420

PM

The Amazing Walk-Behind Brush Cutter!

NEW DR® FIELD and BRUSH MOWER

CLEARS & MAINTAINS meadows, pastures, woodlots, wooded and rough non-lawn areas with ease. **CUTS** tall grass, weeds, brambles, tough brush and even hardwood saplings up to 1" thick.

CHOPS/MULCHES most everything it cuts. Leaves NO TANGLE of brush to pick up like hand-held brushcutters and sicklebar mowers. Perfect for *low-maintenance wildflower meadows, European-style woodlots,* walking paths, or any area you only want to mow once a month or once a season!

- *Up to 14 HP*
- *4 Speeds*
- *Power Reverse*

Mows up to 1 acre per hour!

TOLL FREE 1(800) 641-2244

Pat. Pend.

Please mail this coupon **TODAY** for complete **FREE DETAILS** of the **DR® FIELD and BRUSH MOWER** including prices, specifications, and "Off-Season" Savings now in effect. There is no obligation.

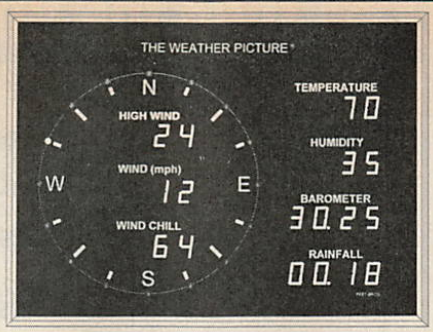
Name _____

Address _____

City _____ State _____ ZIP _____

To: **COUNTRY HOME PRODUCTS®**, Dept. 3619F
Meigs Road, P.O. Box 25, Vergennes, VT 05491

©1998 CHP, Inc.



Size shown: 15 3/4" x 11 3/4"

Put the weather on your wall

The Weather Picture™ is an eye-popping new wall unit that **continuously displays all the vital weather data** you have selected, **without having to press a single button.** Big red numerals are **easy to read from across the room,** day or night. Available in two sizes, in brushed aluminum or elegant solid teak frame. The **separate control unit provides detailed data--**more than enough to satisfy even the most dedicated weather buff.

Purchase the Weather Picture together with the incomparable ULTIMETER® Weather Station, starting at under $400. Or add it to your existing ULTIMETER System for less than $150. It's easy to add programmable display modules to The Weather Picture now or later as needed.

For complete details, call, fax, or write us. **Or visit our Web Site** to see and try our ULTIMETER Systems. "The best!" says *WeatherWatch* magazine.

1-800-USA-PEET

or 732-531-4615 FAX: 732-517-0669

www.peetbros.com

©PEET BROS COMPANY

1308-804M Doris Ave., Ocean, NJ 07712

VISA MC AMEX C.O.D.

CABLE TV

CONVERTERS & EQUIPMENT

* 30 day money back guarantee
* Quantity discount
* 1-year warranty
* Dealers welcome!

TEKVIEW ELECTRONICS

(800)739-2253

Interactive catalog:**www.tekview.com**

BUILD & FLY YOUR OWN HELICOPTER

Estimated 300 Hours Assembly Time • Proven Performance & Reliability
Patented Electronic Fuel Injection/Ignition • 95 MPH Cruise Speed
Flight/Maintenance Training • Comprehensive Construction Video's/Manuals

ROTORWAY INTERNATIONAL

Info Pack & Video $25
602-961-1001

www.rotorway.com • 4140 W. Mercury Way Chandler, AZ 85226

GO KARTS

LARGEST SELECTION
DISCOUNT PRICES

FUN KARTS • RACING KARTS
ALL-TERRAIN KARTS • MINIBIKES
ENGINES • KITS • PARTS

1-440-357-5569
OR
1-216-357-5569

KART WORLD
1488 Mentor Ave., Dept. M
Painesville, Ohio 44077

88 PAGE CATALOG $3.00
Order the catalog by phone on Visa, MasterCard, Discover or mail $3.00 to Kart World. Catalog sent by 1st Class Mail.

Patent Pending

COVER-IT NOW PAY LATER!*

INSTANT GARAGES

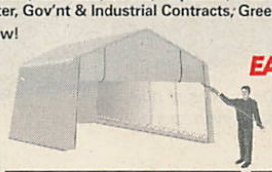
Starting At **$199**

COVER-IT™ Protects Cars, Trucks, Boats, RV's, Motorcycles, Pools, Hot Tubs, Docks, Airplanes, Machinery. Great for Workshops, Restoration, Paintbooths, Sandblasting, Camp. or Temp. Shelter, Gov'nt & Industrial Contracts, Greenhouses & More.

- **WITHSTANDS** Ice, Rain, High Winds, Sun, Sap & Heavy Snow!
- **SIZES** from 5' to 60'w, up to 30'h, Any Length.
- **HEAVY DUTY** Bolt Together, Galvanized Steel Frame. Durable Cover & Zipper Door. Covers last to 20 years.
- **EASY** Assembly & Anchoring.

SHIPPED TO YOUR DOOR!

DEALERS & EXPORTERS WANTED.



EASY ROLL-UP DOOR™

Kit Holds Door in Any Position Fits All Shelters. Weather Proof

Only $39.00

Screenhouses

Bug Proof Shelters are Great for Backyard Entertaining!

30 DAY MONEY BACK GUARANTEE!* **2 YEAR WARRANTY**

*Ask for details

COVER IT All Weather Shelters

BUY FACTORY DIRECT! **1-800-932-9344** Ext. 202

FAX: 203-931-4754 203-931-4777

coverit@ct1.nai.net www.cover-it-inc.com

CABLE

DESCRAMBLERS
CONVERTERS
VIDEO CLARIFIERS

Guaranteed to remove all copy protection

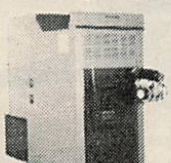
call Electronic City today

FREE CATALOG

1-800-432-5484

Visit our Website @ www.Bestdealonline.com

WOOD HEAT



- *Never be cold again!*
- 20 year warranty
- Heats entire home
- Wood, Wood-oil, Wood-gas models
- Forced Air *or* Hot Water furnaces
- Uses 1/2 the wood as other brands

Call or write for factory direct catalog

Charmaster®

2307A HIGHWAY 2 WEST
GRAND RAPIDS, MINNESOTA 55744
218/326-6786 or 218/326-2636

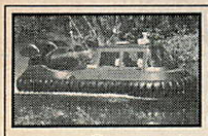
CAD LOADER — Build It Yourself Front End Loader

Buy Plans & Video. Build for under $700 with available Kits for your garden tractor No machining

Send For Free Brochure

CADplans CORPORATION website: www.CADplans.com

P.O. Box 606, Dept. P • Daleville, VA 24083 • 1-800-817-5267



Discover How to Hover

Comprehensive Information Pack $11 US, $15 Foreign (Refundable) AmEx, Visa, MasterCard. Dealerships Available.

Neoteric Hovercraft, Inc.

1649 Tippecanoe St., Dept. 9, Terre Haute, IN USA 47807-2394

800-285-3761 Fax/BBS: 812-234-3217 E-mail: Hovercraft@Delphi.Com

140

CONVERT YOUR TRUCK INTO A 4,000 LB. DUMP TRUCK!

$750

One Model Fits Chevrolet, Dodge & Ford. *Truck Retains Original Appearance.*

Installs easily on all trucks between 1973 & 1995!

Kit comes complete with 12V hydraulic pump & reservoir, hydraulic hose, dash-mounted toggle switch, electric wiring, mounting hardware, 4,000 lb. scissor lift, cylinder & easy-to-read instructions.

PIERCE SALES HENRIETTA, TEXAS

CALL TOLL-FREE: 1-800-658-6301

PH:(940)538-5643 FAX:(940)538-4382

EXPRESSWAY 287 ☆ HENRIETTA, TX 76365

CABLE T.V.

CONVERTERS & EQUIPMENT

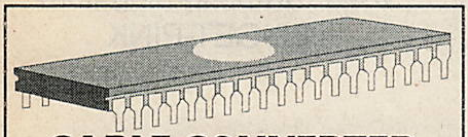
LATEST TECHNOLOGIES AVAILABLE

- 30 Day Money Back Guarantee
- 1 Year Warranty
- Dealers Welcome
- Same Day Shipment

CALL: True Value Engineering

1-888 828-7712

MasterCard VISA COD



CABLE CONVERTER DIAGNOSTIC TEST CHIP

LOAD FULL ACTIVATION OF CABLE CONVERTER

WE STOCK A COMPLETE LINE OF CHIPS,TOOLS, WIRELESS QUICK INSTALL TEST BOARDS AND DIAGNOSTIC CUBES FOR ALL CONVERTERS!

ANYONE IMPLYING ILLEGAL USE WILL BE DENIED SALE.WE SELL PRODUCTS ONLY!! TO TECHNICIANS OR CABLE REPAIR FACILITIES!!

#1 IN CUSTOMER SERVICE & TECH. SUPPORT!

*ALL ORDERS SHIP WITHIN 24HRS, UPS/ FED-X.

*PRIORITY NEXT DAY SHIPPING AVAILABLE!

*SALE= BUY 5 TEST BOARDS AND GET 1 FREE.

*MON-FRI - 8AM-7PM - SAT 10AM-2PM EST.

*WEB PAGE HTTP://WWW.800-GOCABLE.COM

VISA MasterCard VISUAL DISCOVER

COMMUNICATIONS INC.

ORDERS/CATALOG 1-800-GO-CABLE

TOLL FREE TECH. DEPT. 1- 888-519-TECH EST. 1976

Cable T.V.

Converters & Equiptment

Lowest Prices

Dealer Discounts

MC, Visa, AE, COD

30-Day Money Back

1-yr warranty

www.cable4you.com No Florida Sales

1-(800)888-5585

Make $25 to $100 per hour

with **Badge A Minit**™

Yes, it's really possible by making and selling bright colorful Badge-A-Minit buttons. Buttons are proven money-makers at fairs, flea markets, conventions, or anywhere people congregate. They're fast and easy to make with Badge-A-Minit and inexpensive!

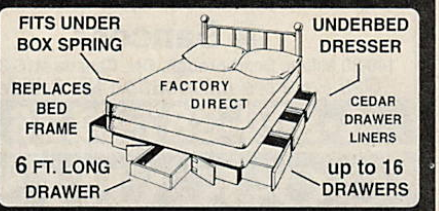
Send for a **FREE** full color catalog or order a Starter Kit for only $29.95 plus $4.50 shipping (IL residents add $1.87 tax).

Badge-A-Minit, Dept.PM498, P.O. Box 800, LaSalle, IL 61301

CALL 1-800-223-4103

Anderson ™

BEDROOM ORGANIZER



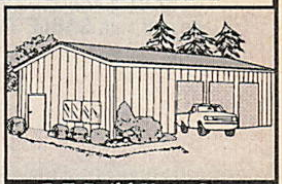
PUT A DRESSER UNDER ANY BED

Increase drawer storage with this beautiful, top quality, solid wood, dust proof, underbed dresser. Fits under any mattress. Shipped UPS

ORDER 48 PAGE CATALOG 615

1-800-782-4825

Shop • RV • Garage



Step By Step Assistance 20 Year Warranty

E-Z Build Your Own

- All Steel Frame & Sheeting
- Pre-Cut W/ Hardware
- EZ Plans & Instructions
- I-Beam Construction

50x75	40x40
$10,577	$5,279

1-800-993-4660

UNIVERSAL STEEL STRUCTURES

SINGERS! REMOVE VOCALS

Unlimited, Low Cost, Instantly Available Background Music from *Original Standard* Recordings! Does Everything Karaoke does... *Better and* gives you the Thompson Vocal Eliminator™ Free Brochure & Demo Tape

LT Sound Dept PM-1 7980 LT Parkway, Lithonia, GA 30058

Internet-http://ltsound.com

24 Hour Demo/Info Request Line (770)482-2485-Ext 61

When You Want Something Better Than Karaoke!

"Removes Adhesives, Gum, Labels, Crayon, Marker, Shoescuffs, Tar, Sap, and More"

You won't believe how quickly and easily XENIT™(zee-nit) removes difficult sticky gunk from carpet, countertops, fabrics, flooring, furniture, glass, metals, upholstery, vinyl, walls, woodwork and more. XENIT removes the stuff that soap and water can't clean. XENIT even lifts chewing gum, dried latex paint, greasy dirt, heel marks, ink, lipstick, and permanent marker. Easy to use - just "wipe away" most gunk and stains. If you have a spot that has been impossible to remove, don't worry! Simply *Clean it with XENIT.*

XENIT contains powerful ingredients like Citrus 66,™ a highly refined natural cleaning agent. XENIT does NOT contain soap or water. Unlike most water-based cleaners that just lift and carry dirt, XENIT's MicroActive™ cleaning action loosens and breaks down the complex molecules found in sticky materials and difficult stains.

Originally developed for precision cleaning in the high-tech plastics industry, XENIT is powerful yet harmless to most surfaces when used as directed. It drys completely, leaves no messy residue, and has a pleasant orange scent. It even contains a disinfectant to help kill germs and odors.

Order now and get 2 cans of XENIT plus 2 FREE bonus cans of *Foaming XENIT Cleaner* (4 cans total) for $19.95 + $4.50 S&H. Save by ordering a 12 can case - call for pricing. Most orders ship within 24 hrs. Money-back guaranteed! If you're not amazed by XENIT, return the unused portion in 30 days for a refund and keep the FREE bonus products. Mail check to address below or call us factory-direct, toll-free, 8am-8pm ET, Monday thru Friday.

1-888-STONER5

VISA MasterCard DISCOVER

Stoner • code XPM3N • 1070 Robert Fulton Hwy • Quarryville, PA 17566

1-888-786-6373 • www.stonersolutions.com • stoner1@epix.net

Stoner

Time Saving Solutions

CABLE DIRECT
CONVERTERS • FILTERS
DESCRAMBLERS

COPY RENTAL TAPES WITH OUR
VIDEO STABILIZERS
100% MONEY BACK GUARANTEE!

30 DAY FREE TRIAL!

FREE Cable TV Catalog.

SAVE $100'S - EVEN $1000'S
on premium CABLE TV EQUIPMENT.

MODERN ELECTRONICS
1-800-906-6664
2609 S. 156TH CIRCLE • OMAHA, NE 68130
http://www.modernelectronics.com

BUILD A BETTER BUILDING
LARGE SAVINGS

NEW

- Easy to Assemble
- Quick Delivery
- Built to Last
- Straight Sides
- Trussless
- All Steel
- 20 Year Guarantee
- Other Shapes Available

GUARANTEED LOWEST PRICES
FACTORY DIRECT 1-800-668-5422
- Sizes 500-20,000 sq. ft.
- Strongest for Wind & Snow
- Heavy 22, 20 & 18 ga. steel
- Maintenance Free

SALE PRICE
FOR EXAMPLE -30' X 40'
$5,688.00
INCLUDES ENDS AND 4' X 7' MAN DOOR

PIONEER STEEL BUILDINGS
http://www.pioneersteel.com

It's SO EASY
to have the garden you've always wanted with a DR® ROTO TILLER/POWER COMPOSTER!

- POWER-DRIVEN WHEELS do the work while you simply guide it with either hand! So PERFECTLY BALANCED, *it's easy for anyone to operate!*
- NO SHAKING...NO STRAIN like you get with front-tines or hand-held tillers!
- TILLS seedbeds, even tough sod with ease... plus POWER COMPOSTS crop residues, leaves, weeds, cover crops, etc., directly into your soil!
- Leaves NO WHEELMARKS or FOOTPRINTS because the tines are in the REAR!

TOLL FREE 1(800)641-2244

Please mail this coupon today FREE DETAILS of the DR® ROTO TILLER/POWER COMPOSTER including prices, specifications of Manual and ELECTRIC-Starting models, and "Off-Season" Savings now in effect.

Name _____
PM
Address _____
City _____ State ____ ZIP _____
TO: COUNTRY HOME PRODUCTS®, Dept. 3619R
Meigs Road, P.O. Box 25, Vergennes, VT 05491

© 1998 CHP, Inc.

WE DARE YOU...

...to find a more intense experience than a SportSub dive. This is not a "wet sub". No breathing or dive gear is worn. Take your friends for rides. 2 & 3-person models in production since 1987. Kits available. Info $9.95, 20-min. action video $24.95. Both $29.95. Outside N.A. add $15.00 U.S. dollar money order or Visa only.
International VentureCraft Corp.
1225 E. Sunset Dr., Suite 500
Bellingham, WA 98226-3529
Order line or Fax: (604) 436-5657
www.ivccorp.com

ENVIROLET™
COMPOSTING TOILET SYSTEMS

Waterless & Low Water Systems
For Cottages, Homes & Business
- ✔ Reduce & Recycle Waste to Natural Garden Soil
- ✔ Efficient, Clean, Sanitary & Odor-Free Operation
- ✔ Function, Elegance, Simplicity & Convenience

Sancor™
140-30 Milner, Scarborough, ON, Canada M1S 3R3
Call For Free Information Kit & Video
1-800-387-5126

GO-KARTS
Over 20,000
Parts • Kits • Engines
180 PAGE CATALOG $5.00
Order catalog by phone on
VISA / MASTERCARD / DISCOVER
or send $5.00 to :
American Power Sports
12300 Kinsman Rd., Newbury, OH 44065
(440) 564-7254

Diesel Truck Owners gain up to 25 HP while saving up to 30% on diesel fuel bills
with the
EC450 On/Off Fan Clutch
- fan engages only when needed
- fast cab warm-up in winter
- requires no maintenance

HORTON®
Available for Dodge Ram Diesel applications and GMC Top Kick
For more information call 800-621-1320

Unbeatable PRICES!
CABLE TV
DESCRAMBLERS
CONVERTERS • FILTERS
VIDEO STABILIZERS
100% MONEY BACK GUARANTEE
FREE ➤ 30 Day Trial
FREE ➤ Product Catalog
FREE ➤ 1 Year Warranty

Let us point you in the right direction ...
Arrow Technologies
13341 A St. • Omaha, NE
TOLL FREE
888-554-ARROW
888-554-2776

Popular Mechanics

advertiserLINK
http://popularmechanics.com

If you wish to obtain more information about our advertisers, please phone their toll-free number or visit their web site at the URL listed below:

COOPER TOOLS
www.coopertools.com

ESCORT, INC.
www.escort.com
800-433-3487

NRI SCHOOLS/McGRAW-HILL Continuing Education Ctr.
www.mhcec.com
800-321-4364 x2482

OWENS CORNING
www.owenscorning.com
800-GET-PINK

SUZUKI
www.suzuki.com
800-828-RIDE

US ARMY
www.goarmy.com
800-USA-ARMY

Need To Know More?

Need to know more about our advertisers' products? It's fast and easy! To order information, simply circle the corresponding numbers of the advertisers listed in this section on the coupon below or call toll free: 800-337-3896. You may also e-mail us at multimedia-ppsb@hearst.com. Please enclose $1.50 for processing your order. When sending e-mail, please include issue date, the requested item numbers (separated by commas), along with your name, daytime phone and address and credit card information. The information featured in this issue will be available through 6/30/98.

CAR CARE/AUTO PRODUCTS

1. Tru-Cut Automotive

New ULTRA-RAMPS® Plus includes an extension kit which provided a no-slip incline and maximum clearance. For cars, light trucks, vans and SUV's (800) 634-RAMP.

2. Lubriplate No. 105 Motor Assembly Grease

Formulated especially for engine and transmission rebuilding. Coats moving metal parts to prevent scuffing and scoring during start-up.

3. Escort, Inc.

The ultimate radar & laser detectors from Escort, the inventor of high-performance detection. New cordless SOLO is the first programmable detector and operates several months on two AA batteries. Test-winning SOLO provides long-range radar and laser protection and its patented DPR circuitry virtually eliminates false alarms.

NEW VEHICLES

4. Suzuki

For more information or for the dealer location near you, visit us on the web at www.suzuki.com or call 800-929-RIDE.

HOME IMPROVEMENT

5. The Bilco Company

A Bilco Basement Door will increase the usefulness of your basement while adding value to your home. Constructed of steel, the attractive, easy operating Bilco Door, will provide long lasting service.

6. NRI Schools

NRI's at-home training in Home Inspection prepares you for a high-demand career with step-by-step lessons, hands-on projects, instructor support, even a multimedia pc you can use to create professional reports for your clients. Free catalog.

7. Stoner Time Saving Solutions

You won't believe how quickly and easily XENIT Remover cleans adhesives, gum, tar, labels and permanent marker from carpet, fabrics, metals, walls, glass, more.

8. Sherwin-Williams

SAVE BIG on your next painting, staining or wallpapering project. Send for a FREE Coupon Savings Book for 20% to 50% off Sherwin-Williams quality paints, stains, painting supplies, wallcovering, wallcovering tools and associated products!

9. Owens-Corning

Owens Corning virtually itch-free PINKPLUS insulation featuring Miraflex fiber and "less-itch" PINKPLUS poly-wrapped fiber glass insulation are what do-it-yourselfers need for more comfortable installation. For a free Home Energy Savings Kit featuring "10 less-itch ways to improve your home's energy efficiency".

10. Grizzly Industrial, Inc.

Carbide tip router bit sets - anti-kickback. These router bit sets contain the most commonly used bits found in most shops. 10 piece general purpose sets - $89.95 and 20 piece general purpose sets - $169.95 (1/4" & 1/2" shank available.)

MISCELLANEOUS

11. Foley-Belsaw: Computer Repair - 64670

The personal computer today is the standard in businesses and homes. This course will provide you with the skills needed to handle the installation, maintenance and repair of new systems as well as the ability to upgrade older systems to new capabilities.

12. Shelburne Co./ Zoysia Farm Nurseries

Discover the seven ways your Amazoy Zoysia Grass lawn saves you time, work and money. Free literature upon request.

13. Reprint Management Services

For high quality article reprints of 100 or more, please contact Dana Warfel at Reprint Management Services, (717) 560-2001, extension 18. Fax (717) 560-2063, e-mail: Sales@RMS Reprints.com

14. FEMA - NFLP

Most homeowner's policies don't cover flood damage. NFLP's Never Say Never brochure describes how to recover from a devastating loss.

15. Sears - Craftsman Tools

Craftsman tools are available at Sears, Sears Hardware Stores, and via the Internet at www.sears.com/craftsman, or call (800) 377-7414, twenty-four hours a day, seven days a week to order your free copy of the "Craftsman Power and Hand Tool" catalog.

16. Penn State Industries

"TURN" A PROFIT! Spend about $3 and a few minutes to make a unique and beautiful woodworking project worth $20 or more. Use our exclusive mini-lathe system and select from our huge selection of gold plated pencrafting projects. Contact PENN STATE INDUSTRIES at 2850 Comly Rd., Phila., PA 19154, call (800) 377-7297 or visit www.pennstateind.com for a FREE Catalog.

ELECTRONICS

17. Crutchfield Corporation

Crutchfield stereo catalog for car audio/home theatre; security/video.

Call 1-800-337-3896 to order information

or, complete the form below and mail, with payment (checks payable to Popular Mechanics), to: Popular Mechanics, P.O. Box 1718, Sandusky, OH 44870. You may also fax your order to (419) 621-4350 or e-mail it to multimedia-ppsb@hearst.com.

Offers valid through June 30, 1998. If material is no longer available, you will be notified by mail.

Name _____

Address _____

City _____

State & Zip Code _____

I am enclosing:

$_____ for priced items

$ 1.50 for handling

$_____ total enclosed

American Express/Master Card/Visa/Discover

_____ Exp.____/____

Signature _____

Available in the continental US only. Allow 6-8 weeks for delivery.

No cash or stamps. April 1998: Expires 6/30/98

Popular Mechanics

Circle the number of the information which you would like to receive:

1. Free	9. Free
2. Free	10. Free
3. Free	11. Free
4. Free	12. Free
5. Free	13. Free
6. Free	14. Free
7. Free	15. Free
8. Free	16. Free
	17. Free

Reader Information

PM Classified Ads

Kevin Bristow: Account Executive
Advertising: 1-800-367-5452 **Subscription: 1-800-333-4948** Circulation: 1,400,000
Backcopies: 1-800-925-0485

The MAY issue closes FEBRUARY 27th (On Sale Date: April 14th)
RATES: $13.85 PER WORD. (12 word minimum) includes Magazine and FREE Internet Advertising*
Bold Face Type: $1.00 extra per word.Gray Background: $54.00 any size. Centered Headline $75.00
*The PM Zone at http://www.popularmechanics.com

All advertising can be mailed, faxed, e-mailed or phoned and is payable in advance by check, money order or credit card. Advertisers wishing to charge on their MasterCard, Visa or American Express accounts, please include the cardholder's name, account number and expiration date. Send order and remittance payable to: Popular Mechanics Classified Advertising, 512 West Burlington Ave., LaGrange IL 60525. Advertisers using a P.O. Box number must furnish complete name and street address for our records.

To reach over 9 million prospects, or for additional advertising information, call Kevin Bristow, ClassMark toll-free at: 1-800-367-5452, fax: 1-708-352-4094, or e-mail: Klassmark@aol.com. Thank you for choosing Popular Mechanics Classified.

AIR COMPRESSORS

INDUSTRIAL GRADE air compressors available 5 to 50 horsepower. http://www.saylor-deall.com or call 1-800-497-9978.

AIR COMPRESSORS Factory Direct, Parts for all makes and models, Free Maintenance Schedule **(800)735-3507.**

ALTERNATIVE ENERGY

BUILD SUN, WIND, WATER-POWERED APPLIANCES. 30 plans. Details, $3.00. MCOAB, 3203 Bordero, 1000 Oaks, CA 91362.

POOR MANS GENERATOR. Simple Plans Available. Send $10.00 to Michael Drummond, 8733 Seigan Lane, 322 Baton Rouge, LA 70810.

ALTERNATIVE INCOME

ALCOHOLISM, STRESS, DEPRESSION, A.D.D. Anxiety, Rehab proven, patented, guaranteed. Tremendous business opportunity. Free Booklet 1-800-900-7028.

ATHLETIC EQUIPMENT/ BODY BUILDING COURSES

BIGGER MUSCLES FASTER! Guaranteed. Free Report. Hercules, 1223 Borg, Temperence, MI 48182.

APPLIANCE TIMERS

REBUILT TIMERS Washers, Dryers, Dishwashers, Timer Motors, Greenwald, Reeco Timers, 888-952-1889.

ARTS, CRAFTS, SUPPLIES

CLOCK WORKS, beading supplies, rockhound supplies, belt buckles, cut stones. Wholesale catalog $1.00. Eloxite, Box 729, Wheatland, Wyoming 82201.

AUTOMOBILES

SEIZED CARS FROM $175. Porsches, Cadillacs, Chevys, BMW's, Corvettes. Also Jeeps, 4WD's. Your Area. Toll Free 1-800-218-9000, Ext. A-6613 for current listings.

CARS FOR $100! Trucks, boats, 4-wheelers, motorhomes, furniture, electronics, computers, etc. by FBI, IRS, DEA. Available your area now. Call 1-800-513-4343, Ext. S-20024.

VAPOR CARBURETOR TRIPLES MPG. Free information. H&A, R2E35P, Bowling Green, MO 63334-9350.

AMSOIL Synthetic Lubricants and Filtration Products. Buy Direct. Free Catalog. Call 1-804-530-1400.

$250 DAILY REBUILDING Alternators and Starters, Details. Mechanical Engineering, #2 William Street, Fort Edward, NY 12828.

SPRING CARLISLE, April 23 - 26, Carlisle PA Fairgrounds, 82 Acres of Automotive Excitement! Collector Car Swapmeet and Car Corral. Over 8,100 Spaces! (717)243-7855.

SPRING MID-WEST Collector Car Swapmeet, Show and Corral, May 15 - 17, at New Interstate Center, Bloomington-Normal, Illinois. Over 5,800 Vendor and Car Corral Spaces plus All-Club Showfield! Space and Event Information. (717)243-7855.

CARLISLE Import - Kit/Replicar Nationals & Custom Compact Power Jam, May 8 - 10, Carlisle, PA Fairgrounds. All Import Swap Meet, Kit Car Manufacturers' Area, Car Corral and Showfield. Win a 1969 Austin Healey Sprite Sunday at 4pm. Space Available. (717) 243-7855.

SPIRALMAX SUPER CHARGE ANY CAR. $79.95. Gain up to 35HP. 31% MPG. Money Back, Lifetime Warranty. 800-758-2017.

NEW! INCREASE YOUR CARS VALUE, before you sell or trade. Sellers guide $5.00 and SASE to: Auto-Wise, 86 W. Main, Shortsville, NY 14548.

AUTO SUPPLIES AND EQUIPMENT

WHOLESALE Auto Parts – Top Brands – Unbelievable prices – All U.S./Foreign Vehicles. 1-800-435-6460.

REBUILT Cylinders Heads. 6500 in stock shipped UPS. Felpro Gaskets. Visa/Mastercard. Alabama Cylinder Head Exchange 1-800-235-4323.

ALL IMPORT Auto Parts, Lowest Prices Anywhere on New OEM Parts. Save This Number! 1-800-592-3878.

150,000 WORRY FREE MILES! Do-it-Yourself Automotive Additive Kit. $39.95, FREE Information. Live Operators, 800-450-4144.

AUTO PARTS - Lowest Prices! All Major Brands - Also Serving Overseas Military w/Same Day APO/FPO Shipping. MATTY'S DISCOUNT AUTO PARTS 732-780-4466. www.discountautopart.com

DIRECT FROM MANUFACTURER Up to 50% off on Leather Interiors. Add Luxury & Value Full Factory Specs. Guaranteed Workmanship. All Cars Available. 1-800-940-0123.

AVIATION, HAND GLIDING

BOOMERANGMAN...INCREDIBLE RETURNS. World's Best Hip Tech Designs! **FREE CATALOG.** BoomerangMan, 1806-1 N. 3rd Road, Monroe, LA 71201-4222.

AIRBOATS. Hovercraft Plans. Propellers, Airdrives, Engines. Catalog $5.00. Arrowprop, 610M, Meeker, OK 74855.

GYROCOPTERS: Kits, Plans, Engines, Propellers, Rotorblades. Catalog $5.00: Mike's 2031 E. Hwy 40, Russell, Kansas 67665.

BICYCLES, SUPPLIES

"MOTORIZED BICYCLES" Power Assist For All Bicycles, Recumbents. Dependable. Affordable. Attractive. Complete. Dimension Edge Engines. Free Brochures: 1-406-652-6766. http://www.wtp.net/edgekit

ELECTRIC BIKES/KITS $159.00 - $499.00 Folding, Automatic. 707-765-6992. http://www.iscweb.com/eros

BOATS, OUTBOARDS, TRAILERS AND KITS

NEW 1996 MERCURY AND FORCE Outboards. Scott McCulloch Parts. 516-599-3003.

BOAT PLANS - PATTERNS - KITS - Over 240: Canoes - Kayaks - Hydroplanes - Sea Fleas - Powerboats - Sailboats. Quick/simple Stichenglue. Save! **176-PAGE CATALOG** - $5.00 (Send Airmail). Includes Free "Boatbuilding Supplies Catalog. "Epoxy Manual" $2.00 **GLEN-L,** Box 1804/PM7, 9152 Rosecrans, Bellflower, CA 90707-1804. **562-630-6258.**

BOAT KITS - PLANS - PATTERNS - All types/sizes of boats. **DISCOVER** Epoxy Boatbuilding HUGE CATALOG $5.00, Book "Boatbuilding. $6.00 Free Epoxy/Fiberglass/ Supplies Catalog - **CLARKCRAFT,** 16-6 Aqualane, Tonawanda, NY 14150 **(716) 873-2640, WWW.CLARKCRAFT.COM**

BOOKS & PUBLICATIONS

FREE BOOKLETS; Life, Death, Soul, Resurrection, Pollution Crisis, Hell, Judgement Day, Restitution. Bible Standard (PM), P.O. Box 67, Chester Springs, PA 19425-0067.

"ANARCHIST COOKBOOK" Available again! $25.00 delivered. Barricade Books, Box 1401-X, Secaucus, NJ 07096.

FREE Gift Catalog. A & B Office, 2532 W. 7th Street, Los Angeles, CA 90057-3802.

BUSINESS OPPORTUNITIES

RETIRE EARLY! FANTASTIC PROFITS! FREE REPORT. Smith Enterprises, Box 6833, Lafayette, IN 47903.

GOT WEALTH? New Trade Secrets! Free information shows you how to make Money Fast Guaranteed! Send LSASE: James Carlson, 1534 N. Moorpark Rd., Suite 230, Thousand Oaks, CA 91360.

TIRED OF JUNK ADS. THIS IS NEW! DELTA PLEX INDUSTRIES FIRST-TIME OFFERING, HOME MANAGERS WILL OWN MANUFACTURING BUSINESS AND BE AN INDEPENDENT PART OF THE NETWORK. NO TECHNICAL BACKGROUND NEEDED. SOLID SALES AND INCOME. DETAILS $5.00: DELTA PLEX INDUSTRIES, INC., DEPT. A, P.O. BOX 248, McLEANSVILLE, NC 27301.

FREE Homemailing Program!...$500.00 Weekly!... Send SASE: Superior/PM390, Box 7, Bedford Park, IL 60499.

WE BUY newspaper clippings. $781.23 weekly. Send stamped envelope. Edwards, Box 467159GH, Atlanta, GA 31146.

MAKE YOUR DREAM COME TRUE, EARN $75,000 YEARLY REPAIRING CRACKS IN WINDSHIELDS AND PLATE GLASS, NOT REPLACING THEM. CALL 1-800-826-8523 (US/CANADA): THE GLASS MECHANIX, 4555 N.W. 103RD AVENUE, FT. LAUDERDALE, FL 33351, WEBSITE: http://www.the-glass-mechanix.com

HYDRAULIC JACK REPAIR MANUAL, CATALOG $10.00, HYDRAULIC PARTS SUPPLY, BOX 4157, BROWNSVILLE, TEXAS 78523-4157.

INSTANT MAIL ORDER BUSINESS. Turnkey package! Big profits! Free details! JPC-PM4, Box 795912, Dallas, TX 75379.

"MANUFACTURE GIANT 6' PROJECTION TVs" - Huge Profits!!! Simple!!! Sony Quality!!! Catalog $1.00 **POLIVISION,** 187-PM, Cypress, Throop, PA 18512-1429. (717-489-3292).

$1800 WEEKLY Recording Videotapes at Home. No Copyright Violation. Free Startup Information CMS Video, 210 Lorna Square #163-PMF, Birmingham, AL 35216.

PIANO Tuning quickly learned with home study courses, Diploma granted. American Tuning School, 17050 Telfer Drive, Morgan Hill, California 95037.

MAKE $90.00 PER HOUR Repairing Cracked Windshields, Low Investment. Guaranteed Fastest System. Resin from $3.10/oz. Free report. 800-695-6224. **NVS/OPTIKLEER, Lynn,** MA 01904.

EASY Riches $1000s weekly. Write or send stamped, addressed envelope. Brenerton, 1115 East Ridge Road, Griffith, IN 46319-1367.

PLASTERCRAFT... Profitable Home Business 3000 Molds Available. Details. Lynnette, 6251C Mentpark, Mentor, Ohio 44060.

$1,500/Thousand Immediately Stuffing Envelopes. Free Supplies. Send SASE: J.H. Enterprises, Dept. PM4, 114-1027, Davie Street, Vancouver, BC V6E 4L2.

BE YOUR OWN BOSS, REPAIR CRACKED WINDSHIELD. It's easy, We'll teach you how to start your own business. Keep all the money you earn. Patented equipment. Free: valuable report. Call 1-800-321-2597, Glass-Weld Systems, Inc. Box 5755-D Bend, OR 97708.

$100,000 SELLING BOOKS BY MAIL, FREE CATALOG - WE DROP SHIP. 1-800-550-9979.

$270.00 Everytime...Using Mail Order Information Sellers Secrets. AmPress Box 28723-PM48, Columbus, OH 43228.

$1000'S weekly mailing burglar alarm advertisements! Free supplies/postage! SASE: RBM P, PO Box 759, Lake Zurich, Illinois 60047.

#1 MONEY MAKER Spare Time! No selling! No inventory! Publicly documented seven week $19,919 income! Free audio cassette and Report reveal everything. Real Money, 333-PM48, SW 5th Street, Grants Pass, OR 97526.

LEARN Sewing Machine Repairing. Men, Women. Lucrative Profits! Gresslin Correspondence School, Box 405-P, Alexandria, Ohio 43001.

CAR Lover's Dream Business - Do You Love Cars? Earn $150,000 Annually P/T or F/T. Complete training and support. Investment required. 1-800-947-7851.

INSTANT HOME BUSINESS. Turnkey Package! **BIG PROFITS! FREE DETAILS!** SamG Enterprises, Dept PM4, 2422 NW 49th Terrace, Coconut Creek, Florida 33063.

EARN $300 - $600 A DAY! Home based printing business. Detailed booklet $20.00. Yglesias, Box 121, Seabrook, TX 77586.

$1500 Monthly Raising Gourmet Mushrooms For Us. **FREE DETAILS,** Sparetime Enterprises, Box 142P, Mt. Vernon, OH 43050. 1-800-910-3086.

BIG Money Daily. Millionaire reveals secrets $23.00. Free details. L.G. Robinson Enterprises, Box 190550, Fort Lauderdale, FL 33319.

WE PAY YOU TO DRIVE YOUR DREAM CAR. High Income Opportunity! 888-248-6855.

MAKE A Fortune in Import - Export. Full information free: Kelmar, P.O. Box 25364, Tamarac, FL 33320-5364.

OVER 7400 FREE ITEMS BY MAIL! NEW 1998 SOURCES DIRECTORY. 96 Pages "$14.00": NIO, 1412B-166 East Blvd., Charlotte, NC 28203.

BE YOUR OWN BOSS! $2500+/Week! Beginning in 4-8 weeks! **NOT a MLM!** $1500.00 Capital required. Entrepreneurial People only. Call 24 hour msg. 800-995-0796 Ext. 8543.

EARN BIG MONEY. Owning your own internet or 900 # business Call 1-888-484-9702 or write: Saturn Communications, 18459 Pines Blvd. #220, Pembroke Pines, FL 33029. www.saturncommunications.com

CLOCK & WATCH REPAIR VIDEO COURSES Learn Fast. **Enormous Demand** for these dying arts! Free Literature 800-853-6553. www.tascione.com

$1000.+ WEEKLY WORK AT HOME. Guaranteed Act Now! Send SASE to: ZION ENTERPRISES, 4360 E. Main St. - Suite 201PM1, Ventura, CA 93003.

HOME BUSINESSES, 1,250 Different, Free Report, Pinnacle, Box 1123A, Ashland, KY 41105-1123.

EARN $2,000.00 PER 400 STUFFED ENVELOPES. FREE DETAILS. SASE: ELOX-P, P.O. BOX 183493, SHELBY TOWNSHIP, MI 48318-3493.

DON'T FALL FOR MONEY MAKING SCAMS! Receive **FREE** details about legitimate Money Making opportunities. Rush SASE to Eureka Publishing, 8972 Quioccasin Road #144, Richmond, VA 23229.

SALES: Get cold feet from cold calling? Overcome your fear. Send $14.95 – RSR Associates, P.O. Box 563, Keyport, NJ 07735.

BUY IT WHOLESALE

39,457 PRODUCTS, FACTORY DIRECT...TAIWAN, HKONG, MEXICO!! SAVE 500 - 900%, Echo, Box 739-P48. Shalimar, FL 32579-0739.

FREE 1998 600,000 ITEMS, Wholesale Directory. (LSASE): TNT, Box 2614PM, Big River, CA 92242.

WHOLESALE DIRECTORIES. Worldwide factory direct sources revealed. Free Report. Recorded information. (415) 456-5663.

CABLE TV EQUIPMENT

CABLE BULLET "TERMINATOR/I.D. BUSTER", Electronically shields yourself and your box. LIFETIME GUARANTEE. Wholesale prices. 1-800-820-9024.

CABLE DESCRAMBLER!!! ANYONE CAN BUILD in **SEVEN STEPS** with **RADIO SHACK PARTS. PLANS/KIT** from **$5.00** plus **FREE BONUS!! 1-800-818-9103.**

CABLES NEWEST MULTI-MODE TECHNOLOGY!!! "DESCRAMBLES EVERYTHING PERMANENTLY!" MONEY-BACK GUARANTEE ... TOLL FREE 1-888-331-1107. INFORMATION ... 1-718-251-7795.

CABLE CONVERTERS, TEST MODULES. Money-Back Guarantee. **EXTREMELY COMPETITIVE.** New Universal Auto-multimode module. Raw equipment. Catalog. Credit card, COD **1-888-443-9185.**

CABLE TV DESCRAMBLING

TURN-ON CHIPS - Easy To Install. Jerrold, Pioneer, Scientific Atlanta, Zenith, Quantity Pricing Available. All Orders Shipped Within Twenty-four Hours. (1-800-800-8532) **TAZ ELECTRONICS GUARANTEED.**

JERROLD and Pioneer Wireless Test Units $125.00 Each. Call 24Hr. Hotline 516-389-3536.

CABLE descramblers, programmers and chips. Free bullet buster, Undetectable circuit. Se habla espanol. 1-800-435-0523.

CABLE CONVERTERS, Test Chips, Moneyback Guarantee. 1 Year Warranty. JCB Electronics, 1-800-579-3285.

DESCRAMBLERS, CONVERTERS ALL OPTIONS EXPLAINED BEST PRICES, SERVICE, WARRANTY, FREE CATALOG. 1-800-854-1674.

PUZZLED About **DESCRAMBLERS??** We'll Explain All Your Options. Wholesale/Retail Open 6 Days, Best Tech Support and Friendly Service. Toll Free **1-888-238-0967.** Royal Engineering Inc.

CABLE CONNECTION FOR ALL YOUR CABLE EQUIPMENT NEEDS. 1-800-756-0683.

CABLE DESCRAMBLERS. All makes, lowest prices around! **PRECISION ELECTRONICS,** Houston, TX 1-888-691-4610.

NEW MASTER PLUS SUPREME 125 channels, works on all systems. **ALL NEW** digital activator, works on all multi-mode systems and more...N7S Inc. 1-888-612-2423.

STOP HERE... We'll Show You The Best Option in **DESCRAMBLERS.** All Models Call For Friendly Service & Low Prices. Open 9 - 8 Mon. - Sat. Gator Electronics. 1-800-238-0118.

CABLE TV EQUIPMENT AND ACCESSORIES. Wholesalers Welcome! 30 Day Moneyback Guarantee! Free Catalog! **PROFORMANCE ELECTRONICS, INC., 1-800-815-1512.**

FREE TV Cable catalog Products & Pricing on Revolutionary Full Viewing Boxes with Dealership 800-676-6342.

A1 Cable Boxes. Descramblers Retail, Wholesales, Dealers Welcome. Web site at www.fbnelectronics.com 1-800-225-9756.

CABLE BULLET SNOOPER. GUARANTEED TO PROTECT ALL YOUR CABLE EQUIPMENT OR YOUR MONEY BACK. 1-800-854-1674.

DEALERS Wanted. All Makes & Models of Converters. Descramblers. Add-ons. Ship COD. 30-Day Money Back Guarantee. Call 1-800-294-7348, Plazac Sales Inc.

CABLE CONVERTERS. LOW PRICES GUARANTEED. ALL MODELS AVAILABLE, OPEN 6 DAYS. T&L 1-888-823-6047.

CABLE TV CONVERTERS: ALL MAJOR MAKES AND MODELS WITH REMOTE. ALSO UNIVERSAL CABLE BOX. 30 DAY MONEY BACK GUARANTEE. DEALERS WELCOME CALL 1-800-538-CABLE.

DESCRAMBLERS ... CONFUSED? We'll explain all your options. All models available Quality service. Open 7 days 9 - 9 EST. **ADVANCED TECHNOLOGIES 1-800-717-1575.**

CABLE T.V. Converters. Accessories. Quality Prices. Satisfaction Guaranteed. COD/Visa/MC/AMEX. 1-800-259-1187. Eagle Electronics Inc.

TEST CHIPS. All chips $24.95 Buy 3 Get 1 Free! Microtech 1-888-3CHIPIT.

BIG SALE!! BEST PRICES!! NOTCH FILTERS $18.00. E-Z Install test **ACTIVATION CHIPS/BOARDS FROM $5.00.** Bullet/ID Stoppers $9.95. **NAME BRAND DESCRAMBLERS FROM $99.00.** External activators from $65.00. **DEALERS WELCOME. LET US BEAT YOUR BEST PRICE. 1-800-449-9189 ANYTIME. Se habla espanol.**

#1 PLANS!!! Cable Descramblers Easily Built using Radio Shack Parts. $8.00 Buyers Choice, P.O. Box 603, Sanborn, NY 14132-0603.

TRI-CITY Video is now selling converters/equipment direct at wholesale prices. Big quantity discounts. 1-800-842-9670.

CABLE DESCRAMBLERS, Jerrold & Scientific Atlanta. Original equipment, 1 year warranty, Quantity Discounted. Call B.R.L.D. Electronics, **1-800-322-6316.**

CABLE TV, Descramblers, Converters, Quantity Discounts, Low Low Prices 30 Day-Money Back Guaranteed. Call Now 888-898-3284, Skylab Sales Inc.

CHIPS UNLIMITED OPEN 24 HOURS. Chips! Activators! Boxes! Visa/MC/COD, 1-800-667-2859. 718-445-7554.

ATTENTION DEALERS! SPECIAL INTRODUCTORY OFFER on all cable **TV** Equipment. Buy wholesale & SAVE $100's. **1-888-51CABLE.**

CABLE DESCRAMBLERS shop no more, best prices and tech support. Open 7 days 9 am - 9pm. Website at www.extremecable.com 1-888-609-4910.

SECRET CABLE DESCRAMBLERS! Build your own Descrambler for **LESS** than $12.00 in **SEVEN EASY STEPS! RADIO SHACK** Parts List and FREE Descrambling Methods that **COST NOTHING** To Try, Included. BONUS! Outrageous report showing how people steal electricity without getting caught. Send $10.00 to: **INFORMATION FACTORY,** P.O. Box 669, Seabrook, Texas 77586. For VISA/MC, COD's, 1-281-922-3512 Anytime!

CABLE TV CONVERTERS AND DESCRAMBLERS. Quality Service and Satisfaction Guaranteed! Visa/MC/Amex/COD. Accepted Quantity Discount. CABLE-LINX INC, Mpls, MN. 1-800-501-0095.

FREE DSS TEST CARD Information Package. "Turns On All Channels". Write **SIGNAL SOLUTIONS,** 2711 Buford Road, Suite 180, Richmond, VA 23235.

CRAZY Dan's Price War. Cable Boxes Prices So Low You Won't Believe It. Dan The Cableman, 1-888-429-4369.

FREE Descrambler catalog, 24hr. hotline & service, CC & COD, BMG 800-671-8117.

CB'S RADIO AND HAM EQUIPMENT

CB MODIFICATIONS! Frequencies, sliders, FM, amplifiers, books, kits, repairs, high-performance accessories. Catalog $3.00. CBCI, Box 31500M, Phoenix, AZ 85046.

CELLULAR PHONES

CELLULAR Extensions – Multiple Cell Phones On One #! $129 (770) 913-0200. Fax (770) 352-0200. http://www. cellularextensions.com

CONTACT LENSES

CONTACT LENSES Absolute lowest prices on your contact lenses. Guaranteed. Call 1-800-CONTACTS.

DO IT YOURSELF

BELT BUCKLES for coins, stones, jewelry mountings, cut stones, clock works. Wholesale catalog $1.00. Eloxite, Box 729, Wheatland, Wyoming 82201.

UPHOLSTERY TRAINING VIDEOS. Free Brochure VUE, Box 128PM, El Verano, CA 95433. 800-635-3493. www.upholster.com/vue

DOMES

DOME HOMES. Super-insulated Kits. Simply The Best. Natural Spaces. 1-800-733-7107.

EDUCATION/INSTRUCTION

CASINO RESEARCH TEAM discovers absolutely proven system. Verifiable $600+ daily. Literature: 1-800-341-5446.

A-1 HOME STUDY COURSE Billion Dollar Industry MASTER INSTALLATION OF AUTOSOUND, AUTO-SECURITY & CELLULAR PHONES. Short programs Gain license, many jobs available or start your own business. 1-888-237-8850 toll-free.

PARALEGAL GRADED CURRICULUM. APPROVED home study. Affordable. 100 years experience. Free catalog 800-826-9228. BLACKSTONE SCHOOL OF LAW, PO Box 701449, Dept. PM, Dallas, TX 75370.

TERMPAPER assistance. 19,278 papers available! 306-page catalog – rush $2.00 Research, 11322 Idaho, #206MK, Los Angeles, 90025. Toll Free Hotline: 800-351-0222 or www.research.assistance.com

EARN YOUR DEGREE AT HOME Accredited/ Licensed Degree Programs Credit for Work/Life Experience. Affordable Tuition. Free Catalogue 1-800-977-8449 x 711 **COLUMBIA SOUTHERN UNIVERSITY**.

College **SCHOLARSHIPS, GRANTS, LOANS.** Free Information: 127 Altavista Avenue, Battle Creek, Michigan 49017-8010.

ELECTRONICS

BUGGED? PHONETAPPED? Free Catalog Counter Surveillance Equipment Tells You Fast! 1-800-732-5000, www.greatsouthernsecurity.com

SURVEILLANCE Equipment Night Vision Telephone Security Counter - Surveillance Miniature Cameras. Over 300 Products. www.spybase.com 800-570-5562.

PINHOLE camera $99, 12 hour phone recorder $139, Catalog $5.00. SPY OUTLET, P.O. Box 337, Buffalo, NY 14226. (716) 695-8660. spyoutlet.com

ENERGY SAVING

SUNSCREEN - blocks suns glare/heat 70% through window, 1-888-591-4280. Screenshop, 281 W. Merced, Dinuba, California 93618.

AFS RADIANT BARRIERS - Easy Installation - Energy Savings - Non-Toxic - Everlasting Home Comfort. Reduce Summer Attic Heat Build-Up By As Much As 30%. Also Helps Prevent Winter Heat Loss. Government Tested And Approved. FREE Brochure and Samples. Write to: **ADVANCED FOIL SYSTEMS INC.**, 820 S. Rockefeller Ave., Ste. A, Ontario, Calif. 91761 or Call 1 (800) 421-5947.

ENGINES, MOTORS

ENGINES – Briggs, Kohler, Others – HUGE DISCOUNTS! Catalog $2.00. Engine Mart, 2642 Newfound, Merritt Island, FL 32952.

FINANCIAL

LEGALLY CLEAN CREDIT FILE, Results guaranteed 1-800-463-9337 ext. 5201.

FREE CASH GRANTS! College. Scholarships. Business. Medical bills. Never Repay. Toll Free 1-800-218-9000 Ext. G6613.

DEBT FREE in 5 to 7 years, Mortgage Included, With the money you already earn Free Information. F.F.S., P.O. Box 1230 B, Wautoma, WI 54982.

FREE CASH GRANTS. Never Pay Back! Business, Medical, Debts, Others. Information SASE: Grant-Finders, 7154 North University Drive, #202, Tamarac, FL 33321.

MONEY TROUBLES? Reduce Interest. Lower Credit Card Payments. Restore Credit. Non-Profit, 1-800-SAVE-ME-2.

FREE Cash Grants! $25,000 - $500,000. Available immediately. No repayment! Rush stamped envelope. Grants-E, Box 1080, Tomball, TX 77377.

FREE GOVERNMENT GRANTS! Billions Available! Never Repay! Call (24 Hours): 1(760)599-3502.

MONEY AVAILABLE NOW! Let the Government Finance Your Business Idea. Satisfaction Guaranteed! 1-800-226-3601, Ext. BF 7030.

SAVE FOR YOUR KIDS' COLLEGE WHILE KEEP- ING YOUR FINANCES INTACT. Free Information. Write to: College Funding, Box PM, 1354 Cottonwood Drive, Lewis Center, OH 43035.

DEBT CONSOLIDATION FREE! Cut Payments Up To 50%. Reduce Interest. Stop Collectors. For Immediate Help: Call Genus Nonprofit 888-436-8721. (1074).

VISA/MASTERCARD. Bad. No credit okay! Free information. Call 1-800-846-4992 today!

GRANTFINDINGS. Commercial, Residential, others. No repayments. How: 801 West Nixon, Pasco, WA 99301.

INTERESTED IN CLASSIFIED ADVERTISING?

HAVE you a great idea, a fantastic plan or a very interesting project? Why not put them to work for you! Classified Advertising can be of tremendous value in promoting all these things and more. Learn **"TIPS ON HOW TO MAKE MONEY THROUGH CLASSIFIED ADVERTISING"** Booklet $1.00 (no cash). Write: Popular Mechanics Classified Advertising, 512 West Burlington Ave., LaGrange, IL 60525.

FOR THE HOME

GMX! Premier magnetic water treatment. Easy installation; no electricity; no maintenance. Lifetime warranty. 1-888-460-8306.

GARDENING & LAWN CARE

GROW smoking tobacco. Easy as tomatoes. $9.95 for seed and complete instructions, Landscape Industries, P.O. Box 3193, Freemont, CA 94539.

GREENHOUSE FOR LESS THAN $100. Complete plans and materials list. Send $5.00. Greenhouse, 1278 City Circle Rd., Baxley, GA 31513.

GROW VEGETABLES YEAR AROUND. Beautiful 12 Piece. Greenhouse Starting $998 or plans $5.00. 1-888-933-4769, Major Credit Cards. www.mysticalgarden.com

GO-KARTS, MOTORCYCLES

GO-KARTS, Minibikes and ATV's. Assembled, Kits, Parts, Engine. Discount Prices, Large Selection. 88 Page Catalog $3.00. 216-357-5569. Kart World, Dept. C, 1488 Mentor Avenue, Painesville, Ohio 44077.

MINI-BIKE AND GO KART PARTS for "Lil" Indian and others. Order catalog, Mail $3.00 or call 800-521-6848. Recreational Leisure Corp. Dept. PM, 30717 West 10 Mile Road, Farmington Hills, MI 48336.

GUNS, DECOYS, HUNTING

FREE! HUNTING AND SHOOTING SUPPLY CATALOG. Our catalog has thousands of items for the hunter and shooter. Call for your **FREE MINI CATALOG TODAY! DEPT. PMC, NATCHEZ SHOOTERS SUPPLIES 1-800-251-7839.**

HEARING AIDS

HEARING AIDS. FREE CATALOG. Top name brands. All styles. **POWERFUL, CUSTOM AIDS, REPAIR SERVICE. SAVE** 1/2 or more Power Hearing Systems, Box 31, Alpine, NY 14805. 1-800-260-4134. www.powerhearing.com

FREE Hearing Aid Catalog. All models. Huge savings! No salesman will call. Rhodes, Dept. 31, Brookport, IL 62910. 1-800-320-3300, Ext. R29.

HEARING Aids. Deal Direct, Save Hundreds. Free Trial. 1-800-641-4327. True Sound.

HEARING AIDS – GUARANTEED LOWEST PRICES! No huge commissions. Home trial, terms. All makes. We're the oldest, biggest, best. Custom instrument specialists. Free information, 1-800-323-1212. Lloyds PMC.

HEARING AID CO-OP Save Hundreds on Name brands. Join Today Call **1-800-522-3310.**

HELP WANTED

EARN MONEY reading books! $30,000/yr income potential. Details. 1 (800) 513-4343, Ext. Y-20024.

NEED EXTRA INCOME? ASSEMBLE CRAFT PRODUCTS AT HOME. CALL NOW: 1-800-377-6000, EXT. 7030.

HOME TYPIST, PC Users needed. $45,000 income potential. 1-800-513-4343, Ext. B 20024.

TURBINE GENERATOR MAINTENANCE, INC. is seeking traveling turbine mechanics. Travel pay/per diem/paid lodging. Contact Pat McGuire at 888-832-6846.

EASY Work! Excellent Pay! Assemble Products At Home. Toll-Free 1-800-467-5566 Ext. 5038.

SALES EXPERIENCE? EARN FAST SIX-FIGURE INCOME! RATED #1 CALL (716) 720-6316. 24hrs.

INTERNET

INTERNET GUIDE. Includes insider secrets. $8.00. MorrisInfoSys, Dept. G15, 255 Coggins, Concord, CA 94523.

INVENTIONS WANTED

INVENTORS: Free information tells HOW TO OFFER YOUR INVENTION FOR SALE, LICENSE. Kessler Corp. 43 Years. 1-800-537-1133 or Driklw@aol.com

INVENTORS We will represent your product to INDUSTRY and consult on intellectual property protection. Modest Fees. **FREE INFORMATION PACKETS** 1-888-705-6683 Ext. 2829 /Fax: 315-458-5453.

INVENTORS

FREE Help for inventors! No charge for protection, forms and introduction kit. Affiliated Inventors Foundation, 1-800-525-5885.

INVENTORS For a free information package on our new product development services, call: 1-800-677-6382.

YOUR ADDRESS TO THE WORLD
www.backyardideas.com

INVENTORS – NEVER SEND IDEAS TO STRANGERS! LEARN AFFORDABLE PROTECTION/ MARKETING METHOD – NONPROFIT ORGANIZATION. FREE INFORMATION: 1-800-846-3228.

INVENTORS – URGENT MESSAGE – FROM WASHINGTON DC. 24hr recording. Toll Free 800-211-0893. Request packet 15.

PATENT. Trademark and Copyright Protection For Your Ideas. Registered US Patent Attorney. Call Jack Schwartz 1-800-414-2812, Ext. 11 – For Free Initial Consultation.

REGISTERED PATENT ATTORNEY Former Patent Examiner. 31yrs. Experience. Donald Kettlestrings. 1-800-966-7577.

FREE MARKETING, HELP AVAILABLE, ENGINEERED PROTOTYPING. PATENT PENDING. THIRTY DAYS GUARANTEED. 1-800-841-1708.

INVENTIONS/new products. ISC, America's leading invention firm helps submit to companies. Patent Services. 1-800-288-IDEA.

INVENTORS "Don't Be Fooled!"™ Call Our Inventors Club 1-800-466-1793.

S.E.L.L.® YOUR IDEA ... Free info on Patents, Licensing, Marketing, based on 25Yrs. Exp. Harshaw Research, 800-451-1326.

DEAL DIRECTLY WITH REGISTERED PATENT AGENT and qualified US Patent Office Examiner. **DON'T BE FOOLED BY PHONIES,** Free patent information – "Patent, Develop, Market Your Invention". Richard L. Miller, 12 Parkside Drive, Suite M, Dix Hills, NY 11746-4879. (516) 499-4343, 1-800-242-9853, HTTP://WWW.INVENTGOLD.COM

PATENT IT ECONOMICALLY!! Free details. Licensed since 1958. Near Washington, D.C. Ph.D Associates, 1-800-546-2649.

ACCUSEARCH Specializes in Thorough, Prompt, Inexpensive Patent Searches. 1-800-999-5498.

SELL YOUR INVENTION ON THE WORLDWIDE WEB in our Invention Registry. **AFFORDABLE** patent, trademark and copyright searches and applications by Registered Patent Agent with 32 years experience. Toll-free info - 1 (888) 404-1999. HTTP://www.patentservices.com

BORSARI and Associates, provides professional patent and trademark services. For our inventor's packet, call 800-225-2462.

QUALITY, CONFIDENTIALITY, AFFORDABLE PATENTING AND INDUSTRY PRESENTATION. FINANCING AVAILABLE. FREE INFORMATION 1-800-501-2252.

INVENTORS! Experienced Patent Attorney in Washington, D.C. Area. Free information Package. 800-876-6670. J.P. Halvonik.

WORK DIRECTLY WITH

REGISTERED PATENT, ATTORNEY AND DEGREED ENGINEER with thirty-six years combined engineering and patent experience. U.S. and International patent applications. **PATENT AND DEVELOP** Ideas with the experience of an expert. Call or write for free **CONFIDENTIAL DISCLOSURE RECORD OF INVENTION AND FREE 228 PAGE BROCHURE.** Introduction to Industry, Marketing Plans, Offshore Production, Prototypes, and Research Readily Available. Also specializing in Copyrights and Trademarks. **ASSOCIATES LOCATED NEAR PATENT OFFICE, CREDIT CARDS ACCEPTED, OPEN 24 HOURS.** Michael I. Kroll, Registered Patent Attorney Registration #26,755, 171 Stillwell Lane, Syosset, NY 11791. **TOLL FREE US AND CANADA** 800-367-7774; Toll Free FAX US and Canada 800-367-7773; International Phone/Fax 516-692-2795, Internet - HTTP://Invention.COM E-MAIL: patent@invention.com

U.S. INNOVATIONS - for Inventors, by inventors. Honesty, integrity, knowhow, patenting/marketing help. **800-231-9543.**

FREE Online Introductory Class. Learn to write Provisional Patents. AMERICAN INVENTORS COLLEGE. **WWW.COOLWAR.COM**

INVENTION IDEA PROTECTION KIT. FREE Patent Search. **FREE** Invention Commercialization Process. 301-317-9040.

MAKE MONEY From Your Invention. Audio Tape Tells How. Free info. 1-800-600-0343 Ext. 2475.

MACHINERY, TOOLS AND SUPPLIES

4" METAL Cutting Lathe $137.75 Taig, 12419 Nightingale, Chandler, AZ 85249.

FREE CATALOG featuring **JET** and **EMCO MACHINES.** WWW.BLUERIDGEMACHINERY.COM, 304-562-3538, BLUE RIDGE, Box 536-V, Hurricane WV 25526-0536.

MAGIC TRICKS, JOKES, VENTRILOQUISM

VENTRILOQUIST Supplies, Instruction Information **FREE!** Dummy Catalog $2.00. Maher, Box 420-PM, Littleton, Colorado 80160.

FREE! World's Leading Novelty Catalog. 1600 Jokes, Tricks, Science, Sports, Hobbies. Johnson-Smith, F-01, Brandenton, FL 34206-5500.

PROFESSIONAL MAGIC! Huge Catalog! Over 1,000 Tricks and Books. $6.00. Hank Lee's Magic Factory, Dept. PM4, 127 South Street, Boston, Massachusetts 02111.

MAILORDER OPPORTUNITIES

MAILORDER Millionaire Reveals Moneymaking Secrets. Free, exciting cassette. Mel Powers, 12015 Sherman Road, No. Hollywood, California 91605. http://www.mpowers.com

MATTRESSES

CLINICALLY PROVEN BETTER SLEEP, Patented Memory Foam/Leverspring Mattress. Dealers Nationwide: **1-800-457-6442. www.Supple-Pedic.com**

MISCELLANEOUS

FREE Degrees in Counseling, Spiritual, Hypnotherapy, Holistic, Ministerial, License! P.U.L.C., Box 276265-M, Sacramento, CA 95827.

HOMEOWNERS - Save thousands in interest on your mortgage without refinancing! This service is absolutely free! 24 hour recorded message: 1(800)615-8755.

MONEYMAKING OPPORTUNITIES

CRAPS. Amazing revolutionary system wins consistently. **GUARANTEED!** Free recorded information. 1-800-217-7711.

GAMBLING BOOKS! Play Like the Pros and **WIN.** Free Recorded Message: 1-888-447-1804.

CONSISTANT CASINO CASH-INS Bingo, Blackjack, Video Poker, Roulette, Slots, Poker, Keno, Baccarat. Free Information, Choice Specialties, 407 East 3rd St., #3, Vinton, IA 52349.

FREE MONEYMAKING REPORT - 400% Daily Profits with the Opportunity of your Lifetime! Langley, Box 100219-A, Fort Worth, TX 76185.

MORTGAGE MANAGEMENT

HOMEOWNERS! Save $50 - $150,000 Mortgage Interest! No Cost! Free Information! SASE: Matteson, Box 12681, Scottsdale, AZ 85267-2681.

MUSIC INSTRUCTION/INSTRUMENTS

ACCORDIANS, CONCERTINAS, Button Boxes, New, Used. Buy, Sell, Repairs, Trades. Castiglione, Box 40S, Warren, MI 48090. Catalogs 1-810-755-6050.

OF INTEREST TO ALL

FREE PRIVACY CATALOG. Cash Income opportunities. Secret loans. New Identity. Eden, Box 8410-PC, Fountain Valley, CA 92728. 1-800-338-8484.

OF INTEREST TO MEN

MEET Penpals! Worldwide! Free Details! PIC, Box 461873-PM, Los Angeles, CA 90046, (213) 650-1994.

MEET RUSSIAN SINGLES! Free color catalog - 500 photos. Euro360, P.O. Box 888851; Atlanta, GA 30356. (770)458-0909.

INTRODUCTION & MARRIAGE To Latin Women. 702-438-5149. 24 Hrs. Better Than Gold. Free Info.

101 WAYS TO PLEASE A WOMAN! Send $14.95 to Insur-Services, 9528 Miramar Rd., Suite 46, San Diego, CA 92196. Allow 4 to 6 weeks for delivery.

PLANS, BLUEPRINTS, PROJECTS

WIRE PUZZLE. 16 Pieces, 85 Moves to Remove One Piece (Shuttle) to Solve. **PLANS & SOLUTION** Send: $8.50 to: W.P.P.W., Box 7381, Macon, GA 31209-9998.

CEILING FAN FOR YOUR TENT. Variable Speed, Reversible, Very Light Weight. Plans $5.00: RTL, 146 Normal Ave., Kutztown, PA 19530-1728.

PLANS for Shop Equipment, Tools, Home and Garden Projects, Green Houses,. Alternative Energy. Trailers. Send $1.00 For Price/Description List: TDS, P.O. Box 736, Sparks, NV 89432.

PERFECT MITERS, Picture-frame accuracy, easily constructed tablesaw guide. $9.95 and S.A.S.E.: Raisor, 410 Staton Road, Henryville, IN 47126.

PLASTICS

RUBBER, plastic compounds, techniques, sources. Free information. Castcraft, Box 17000 (A3), Memphis, TN 38187-1000.

PLATING SYSTEMS

GOLD PLATING SYSTEMS - Direct from Manufacturer - Starting at $349.00. Professionally plate Cars, Jewelry, PC boards, Antiques, etc. Call 1-800-256-0692.

PRINTING PRESSES, RUBBER STAMP OUTFITS

FOIL/Letterpress Rubber Stamp Catalogs. Catalog $2.00 Each, Refundable. Barco, Box 1011P, Bensonville, IL 60106.

PROFITABLE OCCUPATIONS

FREE Information Starter & Alternator Rebuilding, Box 422, Seymour, TN 37865.

REAL ESTATE

GOV'T FORECLOSED HOMES FROM pennies on $1.00, Delinquent Tax, Repo's REO's, Your Area. Toll Free (1) 800-218-9000, Ext. H-6613 for current listings.

MONTANA AND WYOMING Trees, Creeks and Wildlife. 35 acres starting at only $14,900. Many other properties and sizes available. Easy Owner Financing. Guaranteed Access. Warranty Deed. Insured Title. Free Color Brochure. Toll Free: 1-800-682-8088. Rocky Mountain Timberlands, 1315 East Main, Dept. PM, P.O. BOX 1153, Bozeman, MT 59771-1153. (406) 586-8088.

CALIFORNIA. Lots. Acreages. Prices Reduced. $40 Down. $40 Monthly. Box 35291, Los Angeles, 90035.

RESIN

RESIN CASTING and Mold Making Supplies. Reproduce your own designs or parts no longer available. Polyester resins, fillers, colors, silicone rubbers. Catalog $3.00. CASTOLITE, Dept. 98D/PM, 4915 Dean, Woodstock, IL 60098.

SATELLITE TV

SKYVISION! Your Satellite Home Entertainment Source. **BEST VALUES:** DBS and C/Ku-band equipment, including 4DTV. Most complete selection: Parts - Tools - Upgrades - Accessories! **FREE** Discount Buyer's Guide, Call 800-543-3025. International 218-739-5231. www.skyvision.com

FREE DSS TEST CARD Information package. Works with new system. Write **SIGNAL SOLUTIONS,** 2711 Buford Road, Suite 180, Richmond, VA 23235.

DSS TEST CARD Authorizes all channels. For Information toll free 1-888-416-7296.

TEST any satellite system and receive all channels. CATALOG $1. Satellite Specialists, 660 Rothesay Avenue, #356, Saint John, NB., Canada, E2H 2H4.

DSS Test Card & Information. Everything Else You Want. Call 1-800-858-2553.

SCANNERS

LISTEN TO CORDLESS PHONES, CELLULAR and more. Modified hand-held scanner receives all. Frequency list included $179.00. 30 day trial, 6 month warranty. MC/VISA/COD. (314) 569-1860. Confidential or Trunk Tracker $259.00.

READ POPULAR MECHANICS Latest Edition of **"TIPS ON HOW TO MAKE MONEY THROUGH CLASSIFIED ADVERTISING",** This informative 24 Page Booklet Will Show You The Do's and Don't of Classified Advertising And How You Can Make It Work For You, So Order Today, Only $1.00 (no cash) Plus You'll Receive A $2.00 Coupon Refundable With Your First Order, Send To: **POPULAR MECHANICS CLASSIFIED,** 512 West Burlington Ave., LaGrange, IL 60525.

SCHOOLS

HIGH SCHOOL AT HOME, DIPLOMA AWARDED, LOW TUITION. OUR CENTENNIAL YEAR – ACCREDITED. PHONE ANYTIME – 800-531-9268 OR WRITE AMERICAN SCHOOL®, DEPT. 345, 2200 E. 170 STREET, LANSING, IL 60438.

SCIENCE AND CHEMISTRY

HOBBYISTS CHEMICALS!!! Highest Quality, Lowest Cost, Lab Glassware, Acids - Supplies, Instructional Books, - Huge Catalog - $2.00. Pyrotek, P.O. Box 300, Sweet Valley, PA 18656. (717) 256-3087.

AMAZING LITTLE PYRAMID! a scale-model pyramid that really works. http://members.aol.com/kapsaris

LABORATORY Chemicals, Glassware, Instruments, Student Kits, 240 Page Catalog $5.00. (REFUNDABLE) Advance Scientific, 2345 SW 34th Street, Fort Lauderdale, FL 33312. (954) 327-0900.

SOLAR AND ALTERNATE ENERGY

FREE ENERGY! Fuelless motors and generators. H&A, 2REPM, Bowling Green, MO 63334-9350.

SOLAR WATER HEATER ONLY $895.00! FREE DELIVERY! Advanced design, easy installation. www.nbbd.com/out/asn

SPECIAL SERVICES

INFORMATION On anything. Ferguson Research Specialist, 60-15 Woodside, Woodside, New York 11377.

STAMPS

100 South Africa plus surprise, $1.00: **NO APPROVALS,** Gibson, Box 727, Lansdowne, PA 19050.

SWIMMING POOLS AND EQUIPMENT

FACTORY DIRECT POOL HEATERS Solar, Gas, Heatpumps, Complete Kits. 1-800-333-WARM. Email: info@solardirect.com

TOOLS FOR SALE

BOLTS, SCREWS, TOOLS, WHOLESALE, DIRECT. Guaranteed. Catalog $2.00. (Refundable). Camelot, Dept. 44, Box 65, Bristol, Wisconsin 53104.

POCKETOURCH - Solders - Loosens Bolts - Refillable - $20.00 (3/$45.00) A.S.I., 212 Evans Lane, Stevensville, MD 21666.

TRUCKS, PARTS & SUPPLIES

TRUCK-BED DRAW PLANS Easy roll out Draw, Full Length & Width, 1000lb Plus Capacity, Completely removable in seconds. Information, Photo's $3.00: B.B. Mac's, 55 Nathans Lane, Madison, CT 06443-2168.

WATER PURIFICATION

GUARANTEED PUREST WATER ... Simple countertop appliance. Free information. (800)874-9028. http://www.waterwise.com

WELDING

STEEL FURNITURE KITS AND COMPONENTS. SEND FOR BROCHURE! SOUTH FLORIDA METAL ARTS, 6601 - F1 LYONS RD., COCONUT CREEK, FL 33073.

WINEMAKING/BEERMAKING

HOMEBREWERS: FREE CATALOG Brew quality beer yourself. Call WindRiver Brewing. 1-800-266-4677.

WINEMAKERS - BEERMAKERS. Free Illustrated Catalog. (800) 841-7404. Kraus, Box 7850-L, Independence, Missouri 64054.

FREE HOMEBREWERS CATALOG. Catalog, Box 14712, Minneapolis, MN 55414-0712. 800-234-0685.

BREWERS! Outstanding products since 1979. Free William's catalog, call 800-759-6025 anytime. www.williams brewing.com

X-TREME SPORTS

PAINTBALL Guns & Accessories. Largest Discount Supplier. Call for Giant Catalog! I&I Sports. 310-715-6800.

PREVIEW

Coming Up In Popular Mechanics

America's Favorite Vehicles

We test the 10 hottest-selling cars and trucks in America. What puts these vehicles at the top of the pack? Read our report to find out.

Online Speed Demons

The new 56.6kbps modems promise the quickest downloads your home computer has ever seen. But do they deliver? Our lab and real-world tests will tell you.

Sticky Situation

You'll become a veritable glue guru after reading our Home Adhesives Guide. Here's more than you ever thought there was to know about glue—from single-purpose specialized adhesives to the versatile multipurpose products that can mend just about anything. Stick with us to get the straight dope.

Magnet Train

New maglev train technology will revolutionize rail transportation by using humble permanent magnets in place of problem-plagued designs that rely on superconductivity.

Next-Generation Supercomputers

Forget silicon. The next generation of supercomputers will use light, DNA and frozen electrons. Here's the full story on these astonishing technologies.

Just For The Hull Of It

Catamarans are now the fastest-growing segment in boating because of their superior stability, fuel efficiency and ride. We look at a variety of new hull types and test four examples to separate the facts from the hype.

POPULAR MECHANICS (ISSN 0032-4558) is published monthly by Hearst Communications, Inc., 959 Eighth Avenue, New York, NY 10019, U.S.A. Subscription prices: United States and possessions, $19.97 for one year; $34.97 for two years. Canada and all other countries, add $16.00 for each year. Periodicals postage paid at New York, NY, and additional mailing offices. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 259179. CANADA BN NBR 10231 0943 RT Send returns to Canadian Direct Mailing Sys. Ltd., 920 Mercer St., Windsor, Ontario N9A 7C2. Registered as second-matter at the Post Office at Mexico D.F., Mexico, June 20, 1950, © 1998 by Hearst Communications, Inc. All rights reserved. Trademarks: Popular Mechanics magazine and Popular Mechanics New Cars and Trucks Buyers Guide trademarks are owned by Hearst Magazines Property, Inc. in U.S.A. and Hearst Communications, Inc. in Canada. Printed in U.S.A. POSTMASTER: Send address changes to Popular Mechanics, P.O. Box 7170, Red Oak, IA 51591.

*Excludes other GM products. ©1997 GM Corp. Buckle up, America!

THE ONLY COMPACT TRUCK TO OFFER A THIRD DOOR.*

OR

A CLOSER LOOK INTO THE SOUL OF A REBEL.

www.chevrolet.com 1-800-955-2848

Chevy™ S-10® Like A Rock

©1998 R.J. REYNOLDS TOBACCO CO.

9 mg. "tar", 0.6 mg. nicotine av. per cigarette by FTC method.

DORAL

And Nobody Else!

Only Doral puts a money back taste guarantee on every single pack. That's the kind of everyday, honest value you just won't find anywhere else.

Discover The Doral Difference.

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

Questions about our Premium Taste Guarantee? Call us at 1-800-252-3500.